NUI Galway
OÉ Gaillimh

HR EXCELLENCE IN RESEARCH

Postdoctoral Researcher

Numerical modelling of NOx formation in gas turbine combustors

College of Engineering and Informatics, NUI Galway

Ref. No. NUIG-055-18

Applications are invited from suitably qualified candidates for a full-time, 24-month fixed term position as a Postdoctoral Researcher to be based in Mechanical Engineering at the National University of Ireland, Galway. This position is funded by Science Foundation Ireland (SFI) and Siemens through the new €3.3M Sustainable Energy and Fuel Efficiency (SEFE) spoke in the Research Centre for Marine and Renewable Energy in Ireland (MaREI, http://www.marei.ie/), and is available from 1 May 2018.

MaREI has over 200 researchers working across 6 academic institutions collaborating with over 45 industry partners to tackle the scientific, technical and socio-economic challenges across the marine and renewable energy sectors. NUI Galway leads the newly-added SEFE spoke at MaREI, which aims to support Ireland's and Europe's transition to sustainable and renewable energy through the development of new processes, technologies and markets. Siemens is a recognised global leader in clean energy technology. Siemens gas turbine engineers in Canada, Germany and Sweden will work closely with the successful candidate. The successful candidate will develop a numerical method to predict NOx emissions from gas turbine combustors using CFD simulations (high fidelity LES), chemical reactor networks (CRNs) and uncertainty quantification (UQ). This work will build on existing efforts (see IGTI paper GT2017-64271) to use detailed chemical kinetic mechanisms to predict NO and NO_2 emissions and formation pathways in gas turbines. The successful candidate will be primarily based at NUI Galway (http://www.nuigalway.ie/therme/ and http://c3.nuigalway.ie/), with frequent interactions with Siemens.

Job Description

The successful candidate will conduct the following activities that are central to the project:

1. Draft toolchain for CRN generation and solution.
2. NOx pathway study for premixed turbulent jet flames, and jet in crossflow like systems, in which secondary fuel-air jets are injected into a hot exhaust gas flow produced in a first stage.
3. Modified toolchain for flexibility of combustor conditions.
4. Study of yellow plume (NO_2) formation and mitigation.
5. Final report on the toolchain.

Additional Duties

In addition to the tasks listed above, the successful candidate will:

1. Be primarily responsible for project management and communications with project partners.
2. Prepare abstracts, manuscripts and presentations for dissemination of the work in high-impact, peer-reviewed journals and international conferences.
3. Assist in the operation of the ThermE research group by assisting in the following: (i) PhD student supervision, (ii) day-to-day management, and (iii) writing research funding applications.
4. Develop their teaching skills by contributing to lectures and undergraduate project supervision.
5. Work with high degrees of independence and dedication to ensure the successful completion of the work.

Qualifications/Skills Required

Essential Requirements - the successful candidate will:

1. Hold a PhD degree in Mechanical, Chemical, Aero/Astro or Energy Engineering, or a closely-related discipline.
2. Have a strong publication record as a first author in peer-reviewed journal papers.
3. Have ***demonstrable*** experience of ***advanced*** use of CFD software, including large eddy simulations, user-defined functions, high-performance computing, turbulence-chemistry interactions, open-source and/or in-house software.
4. Have ***demonstrable*** experience with chemical kinetic modelling using software such as Cantera, Chemkin, DARS, OpenSMOKE, etc.
5. Have ***excellent*** written and spoken English communication skills.
6. Evidence of capability of acting with a high degree of autonomy and self-motivation in working with the industry partner, Siemens.

Desirable Requirements - the successful candidate should:

1. Experience in writing research funding applications.
2. Experience in helping to supervise undergraduate and/or postgraduate projects.
3. Experience in helping to manage laboratories and research teams.
4. Experience with experimental methods including PIV, LDV/LDA and hot-wire anemometry.

Salary: €37,138 per annum

Start date: Position is available from 1 May 2018.

Continuing Professional Development/Training

Researchers at NUI Galway are encouraged to avail of a range of training and development opportunities designed to support their personal career development plans.

Further Information

Further information on research and working at NUI Galway is available on Research at NUI Galway. For information on moving to Ireland please see www.euraxess.ie. Further information about the research partners are available at the links given above. Informal enquiries concerning the post may be made to Dr Rory Monaghan at NUI Galway (rory.monaghan@nuigalway.ie).

To Apply

Applications to include a covering letter, CV, and the contact details of three referees should be sent, via e-mail (in word or PDF only) to Dr Rory Monaghan (rory.monaghan@nuigalway.ie).
Please put reference number **NUIG-055-18** in subject line of e-mail application.

Closing date for receipt of applications is 5.00 pm on Friday 30th March 2018.

All positions are recruited in line with Open, Transparent, Merit (OTM) and Competency based recruitment

National University of Ireland, Galway is an equal opportunities employer.