 

**Postdoctoral Researcher**

**Multiscale modelling of photocatalytic reactors**

**School of Chemistry, NUI Galway**

**Ref. No. NUIG RES 199-21**

Applications are invited from suitably qualified candidates for a full-time, fixed term position as a Postdoctoral Researcher within the School of Engineering at the National University of Ireland, Galway.

The position is funded by the H2020 programme (Grant Agreement 862453) and is available from 1st December 2021 or as soon thereafter for a period of 18 months.

**The Project:**

FlowPhotoChem aims to develop and model an integrated modular system based on continuous-flow heterogeneous photo(electro)catalytic reactors to produce relevant chemicals such as ethylene in the chemical sector, precursor to ""green plastics"" and many other high-value chemicals using abundant renewable resources such as water, carbon dioxide and light. We aim to deliver cost-efficient small-scale systems for intermittent operation to respond to the needs of rural, isolated territories, and distributed manufacturing. Novel multifunctional photo(electro)catalytic materials integrated into practical and scalable reactors are required in Europe to maintain technological leadership in chemical manufacturing, while ensuring the deployment of sustainable and renewable processes in the circular economy and green industry for a low-carbon future. FlowPhotoChem will use the expertise of the partners to design, model, construct and validate an energy efficient integrated modular system with negative CO2 emissions, since concentrated CO2 will be valorised to high-value chemicals. The integrated system will be studied from a life cycle analysis perspective to quantify such effects, and to include a techno-economic study to quantify the cost of the technology and compare with comparable renewable solutions for the production of the same/similar chemicals.

**Job Description:**

The successful candidate will work under the supervision of Dr Rory Monaghan to develop a multi-physics (and potentially multi-scale) model to describe and predict the performance of gas-phase photocatalytic reactors, in particular for photocatalytic CO2 hydrogenation in a flow photoreactor. It will account for fluid dynamics, photochemical reaction, and heat transfer. The model will rely on input parameters derived both from experiments and multi-scale/atomistic simulations. The developed model will help to design the flow reactor to optimise space-time yields of the targeted compounds.

**Duties:**

* Support the PI on liaising and reporting to the Project Coordinator which includes preparation of periodic scientific reports.
* Keep appropriate records as directed and in line with Funder/University policy.
* Designing of computational multi-physics models based on demonstrator reactors to be developed within the frame of the project.
* Liaise with other project partners to combine multi-physics models with experimental data and atomistic simulations.
* Mentor and assist, as appropriate and as directed, the research graduate students in the group.
* Contribute to the research project’s dissemination in whatever form - report, papers, chapters, book.

**Qualifications/Skills required:**

The ideal candidate should hold a PhD in Engineering, have a strong background in advanced computational methods in fields such as multiphase reactions, catalytic processes, radiative transfer, or material science, and will be expected to have performed original scientific research within multi-physics, mesoscopic and/or reactor level simulations of complex reacting systems. Candidates should have excellent communication and organizational skills; be highly motivated and passionate about renewable energy/fuels; and have strong documentation, oral and interpersonal skills. The position requires communication with the different partners of the consortium, thus excellent communication skills are mandatory.

**Essential Requirements:**

* PhD in Engineering
* Evidence of experience in computational multi-physics modelling in chemically reactive systems
* Evidence of experience in multi-scale modelling
* Demonstrable experience in both independent and collaborative research
* Excellent verbal and written communication skills (English language)
* Evidence of scientific publication and dissemination of results at conferences

**Desirable Requirements:**

* Experience in working in a team
* Experience in photocatalytic reactor modelling
* Evidence of innovative thinking, able to work both independently and in cross-disciplinary teams
* Appropriate supervisory or teaching experience may be an advantage

**Employment permit restrictions apply for this category of post**

**Salary range**: €38,631 - €42,201 per annum

**Start date**: Position is available from December 2021.

**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 on research and working at NUI Galway is available on [Research at NUI Galway](http://www.nuigalway.ie/our-research/)

For information on moving to Ireland please see [www.euraxess.ie](http://www.euraxess.ie)

Informal enquiries concerning the post may be made to Dr Rory Monaghan, e-mail rory.monaghan@nuigalway.ie.

**NB**: Gárda vetting is a requirement for this post (as appropriate to Child Protection Policy)

**To Apply:**

Applications to include a covering letter, CV and contact details for two referees should be sent, via e-mail (in word or PDF only) to Dr Rory Monaghan and Dr Pau Farràs: e-mails rory.monaghan@nuigalway.ie and pau.farras@nuigalway.ie. Please put reference number **NUIG RES 199-21** in subject line of e-mail application.

**Closing date for receipt of applications is 5.00 pm on Friday 15th October 2021.**

**Interviews are planned to be held on week starting on 25th October 2021.**

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.