

**PGRS FindaPhD**  
**Advertising Pro-Forma**

**Please complete and return to your school PGR administrator once approved, who will liaise with PGRS admissions for the advertisement of this position.**

Studentship Details			
<b>Project Title (up to 255 characters)</b>	Liquid hydrogen fuelling process simulation – paving the way for digital twinning hydrogen safety		
<b>Closing Date</b>	The advert will stay live for 12 months. If you wish for it to be removed, please ask <a href="mailto:pgrs-admissions@abdn.ac.uk">pgrs-admissions@abdn.ac.uk</a>		
Supervisors			
<b>Please give the names of <u>TWO</u> internal supervisors – including title, email address and staff ID number</b>			
<b>Internal Supervisor 1 (Lead)</b>	Dr Henry Tan, <a href="mailto:h.tan@abdn.ac.uk">h.tan@abdn.ac.uk</a> , 41018314	<b>FTE split (%)</b>	70
<b>Internal Supervisor 2</b>	Dr Yeshui Zhang, <a href="mailto:Yeshui.zhang@abdn.ac.uk">Yeshui.zhang@abdn.ac.uk</a> , 41029973	<b>FTE split (%)</b>	30
<b>External Supervisor</b>	Industrial supervisor BP: Owen Quake, Head of HSE & Carbon - Hydrogen and CCS, BP Industrial supervisor DNV: Yura Sevcenco, Principal Hydrogen Consultant, DNV		
<b>External E-mail</b>	<a href="mailto:Owen.Quake@se1.bp.com">Owen.Quake@se1.bp.com</a> <a href="mailto:Yura.Sevcenco@dnv.com">Yura.Sevcenco@dnv.com</a>		
<b>External Institute / Organisation</b>	BP and DNV		
Project Summary: Background (up to 500 words about project)			
<p><b>About the Project:</b></p> <p>In our pursuit of a sustainable future, hydrogen has taken centre stage as a promising energy carrier. Liquid hydrogen, specifically, holds potential for transporting energy over intermediate regional distances, including its prospects for powering long-haul trucks. However, the unique safety challenges of liquid hydrogen's extremely cold nature and distinct behaviours require innovative solutions for its efficient and safe utilisation.</p> <p>While ample research exists on liquid hydrogen's behaviour during process safety incidents, there's a gap in proactive safety measures and operational practices. This project seeks to fill that void, laying the groundwork for a safer hydrogen fuelling process.</p> <p>The project's core objectives are:</p> <ol style="list-style-type: none"> <li>1) Simulate Liquid Hydrogen Fuelling Process: Delve deep into the challenges of liquid hydrogen. Draw from existing research and standards to create a process model for liquid hydrogen's unloading, storage, gasification, and compression system.</li> <li>2) Leverage CFD Modelling: Utilize Computational Fluid Dynamics modelling for a liquid hydrogen spill, employing ANSYS-FLUENT software.</li> <li>3) Collaborate on Hydrogen Explosion Experiments: Partner with industry leaders BP and DNV to conduct hydrogen explosion tests, aiming to validate the risk evaluations produced from our simulations.</li> </ol> <p>This initiative is a pivotal step towards developing a digital twin for hydrogen safety. With the completion of this project, we anticipate paving the way for subsequent phases, encompassing lab-scale digital twin establishment and a broader digital twin application for hydrogen safety.</p>			

**Vision:**

We envision an innovative future where liquid hydrogen's safety is enhanced by simulating its fuelling processes, predicting risks, and integrating these findings into real-world systems for improved safety protocols.

By achieving these goals, we inch closer to unlocking hydrogen's full promise as a green energy carrier, ensuring its safe and efficient deployment.

**Eligibility & Application:**

We're seeking a dedicated UK home PhD candidate eager to contribute to this transformative research. Prospective candidates should possess a robust academic background and a keen interest in hydrogen energy and safety solutions.

Selection will prioritise candidates showcasing academic excellence. Eligible candidates should either have or be in the process of obtaining a UK Honours Degree with a 2.1 grade or higher. This degree should be in Mechanical Engineering, Chemical Engineering, or a closely associated field emphasising numerical simulation.

**Essential background of student (first degree, necessary experience)**

CFD simulation, Mechanical Engineering, Chemical Engineering, or relevant disciplines.

**References (if required, max 6)**

None.

**Funding**

Please provide **FULL** details of funding (e.g. name of funder, % of funding, what funding is being provided including ARC/RTSG, has this funding been secured etc.). **For unfunded project please state ARC costs required, if any otherwise we will be unable to request these at a later date.**

**For unfunded projects we will use text provided by PGRS across all projects, but if ARC is required the PI should provide information on this for inclusion.**

Project Period: 3.5 years, commencing on 1<sup>st</sup> August 2024 or earlier when the ideal candidate is identified.

A fully funded PhD studentship funded by BP and DNV, this post will fully cover university tuition fees and provide a tax-free stipend for 3.5 years for UK students of £18,806 per year.

**School Approval**

Comments/Authorisation to advertise PGR Coordinator/DoR

PhD Disciplines & Subject areas**Agriculture**

agricultural sciences

agricultural technology

- arable farming
- livestock farming
- forestry & arboriculture
- other

#### Anthropology

- biological anthropology
- social anthropology
- other

#### Architecture, Building & Planning

- architecture
- built environment
- construction management
- landscape architecture
- rural planning
- surveying
- urban planning
- other

#### Biological Sciences

- bacteriology
- behavioural biology
- biochemistry
- biodiversity
- bioinformatics
- biophysics
- biotechnology
- cancer biology
- cell biology
- developmental biology

- ecology
- ecotoxicology
- entomology
- environmental biology
- evolution
- genetic engineering
- genetics
- genomics
- human genetics
- immunology
- marine biology
- microbiology
- molecular biology
- molecular genetics
- neuroscience
- parasitology
- plant biology
- plant cell biology
- reproductive biology
- structural biology
- systematic biology
- virology
- zoology
- other

#### Business & Management

- accounting
- business
- e business
- education management
- event management

- hospitality
- human resource management
- management
- marketing
- project management
- sport management
- tourism
- other

### Chemistry

- analytical chemistry
- applied chemistry
- computational chemistry
- environmental chemistry
- industrial chemistry
- inorganic chemistry
- organic chemistry
- petrochemical chemistry
- pharmaceutical chemistry
- physical chemistry
- polymer chemistry
- structural chemistry
- synthetic chemistry
- other

### Communication & Media Studies

- broadcast media
- digital media
- journalism
- print media
- production

- public relations
- publishing
- other

### Computer Science

- artificial intelligence
- computer architectures
- computer vision
- computer graphics
- cyber security
- data science
- human computer interaction
- internet of things
- machine learning
- networks
- quantum computing
- software engineering
- videogames
- other

### Creative Arts & Design

- animation
- art
- crafts
- creative writing
- dance
- design
- drama
- fashion
- film studies
- fine art

- graphic design
- interior design
- music
- music technology
- photography
- theatre studies
- other

#### Economics

- econometrics
- financial economics
- macroeconomics
- microeconomics
- political economics
- other

#### Education

- further education
- higher education
- nursery education
- primary education
- secondary education
- special needs education
- other

#### Engineering

- acoustics engineering
- aerospace engineering
- atomic engineering
- automotive engineering
- bioengineering

- biomedical engineering
- chemical engineering
- civil engineering
- communications engineering
- control systems
- cybernetics
- dynamics
- electrical engineering
- electronic engineering
- energy technologies
- environmental engineering
- fluid mechanics
- gas engineering
- geotechnical engineering
- integrated engineering
- manufacturing engineering
- marine engineering
- mechanical engineering
- mechanics
- mechatronics
- nanotechnology
- offshore engineering
- petroleum engineering
- robotics
- solid mechanics
- structural engineering
- structural mechanics
- systems engineering
- thermodynamics
- other

### Environmental Sciences

- climate science
- hydrology
- marine sciences
- meteorology
- pollution
- soil science
- other

### Finance

- actuarial science
- banking
- financial management
- insurance
- investment
- taxation
- other

### Food Sciences

- food hygiene
- food production
- other

### Forensic and Archaeological Sciences

- archaeological science
- forensic science
- other

### Geography

- agricultural geography
- cultural geography

- economic geography
- environmental geography
- geographical information systems gis
- historical geography
- human geography
- marine geography
- physical geography
- political geography
- remote sensing
- social geography
- transport geography
- urban geography
- other

### Geology

- applied geology
- geochemistry
- geophysics
- geoscience
- geotechnology
- hydrogeology
- marine geology
- palaeontology
- seismology
- volcanology
- other

### History & Archaeology

- african history
- american history
- ancient history

- archaeology
- asian history
- australasian history
- british and irish history
- economic history
- european history
- heritage studies
- history
- history of art
- history of religions
- history of science
- medieval history
- military history
- modern history
- russian history
- social history
- world history
- other

#### Information Services

- information security
- information systems
- librarianship
- other

#### Languages, Literature & Culture

- african studies
- american studies
- asian studies
- australasian studies
- chinese

- danish
- dutch
- english language
- english literature
- european studies
- finnish
- french
- german
- italian
- japanese
- middle eastern studies
- norwegian
- portuguese
- russian
- spanish
- swedish
- other

#### Law

- criminal law
- commercial law
- contract law
- property law
- other

#### Linguistics & Classics

- ancient greek
- celtic studies
- classics
- latin
- linguistics

other

### Materials Science

- ceramics
- glass
- metallurgy
- polymers
- textiles
- other

### Mathematics

- applied mathematics
- applied statistics
- computational mathematics
- data analysis
- engineering mathematics
- mathematical modelling
- medical statistics
- operational research
- probability
- pure mathematics
- statistics
- stochastic processes
- other

### Medicine

- anatomy
- audiology
- biomechanics
- cardiology
- complementary medicine
- dentistry
- endocrinology
- epidemiology
- neural engineering
- neurology
- nutrition
- ophthalmology
- optometry
- pathology
- pharmacology
- pharmacy
- physiology
- physiotherapy
- podiatry
- radiology
- speech science
- tissue engineering
- toxicology
- other

### Nursing & Health

- adult nursing
- community nursing
- counselling
- dental nursing



- environmental health
- health informatics
- medical nursing
- mental health nursing
- midwifery
- occupational health
- occupational therapy
- paediatric nursing
- paramedical science
- surgical nursing
- other

#### Philosophy

- ethics
- metaphysics
- philosophy of science
- other

#### Physics

- acoustics
- astronomy
- astrophysics
- chemical physics
- computational physics
- electromagnetism
- environmental physics
- experimental physics
- medical physics
- nuclear physics
- optical physics
- particle physics

- quantum mechanics
- solid state physics
- space science
- theoretical physics
- other

#### Politics & Government

- development studies
- government
- international relations
- politics
- public policy
- other

#### Psychology

- child psychology
- clinical psychology
- community psychology
- counselling psychology
- developmental psychology
- educational psychology
- forensic psychology
- health psychology
- neuropsychology
- occupational psychology
- organisational psychology
- psychotherapy
- sport psychology
- other

#### Sociology

- criminology
- disability studies
- gender studies
- socio economics
- social work
- other

#### Sport & Exercise Science

- sport coaching
- sport development
- sport performance
- sport technology
- sport therapy
- other

#### Theology & Religious Studies

- divinity
- religious studies
- theology
- other

#### Veterinary Sciences

- animal welfare
- veterinary dentistry
- veterinary medicine
- veterinary nursing
- veterinary nutrition
- veterinary pathology
- other