



## Research Assistant (Early Stage Researcher) School of Engineering

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**Closing date:** 09 June 2020

**Interview date:** TBC

**Reference number:** ENG153R



## Introduction

### ESR05 -Hydrodynamics of swimming fish: drag, propulsion, and fish bioenergetics

In 2016 serious concerns on the achievement of the EU Biodiversity Strategy 2020 targets, due to the continuing loss of biodiversity and degradation of aquatic habitats, led to the urgent adoption of a new Resolution for implementing ecosystem restoration measures. Moreover, on December 2018 the EU raised to 32% the binding renewable energy target for 2030, bringing further input to hydropower development. Meeting these targets sets challenging issues for mitigating the impacts of man-made structures in rivers that fragment habitats and prevent movement and migration of aquatic organisms. **To address these challenges**, the EU ETN Project 'River flow regulation, fish BEhaviour and Status' (RIBES) will train 15 Early Stage Researchers (ESRs) in the interdisciplinary field of Ecohydraulics to find innovative solutions for freshwater fish protection and river continuity restoration in anthropogenically altered rivers. The 15 ESRs will carry out an innovative and integrated research programme within a multidisciplinary and intersectoral Network, including 8 leading European Universities, consultancy companies, public agencies and hydropower industry, encompassing experts in fish biology, river ecology, environmental fluid mechanics and hydraulic engineering. The 15 ESRs will have access to a number of laboratory and field facilities, modelling techniques, experimental practices and instrumental technologies, to expand current understanding of key fundamental fish bio-mechanical, behavioural and physiological processes, and to promote development of novel tools and management solutions in the area of freshwater fish protection. ESRs will be enrolled in specific PhD training programmes according to the rules of 6 host countries and will undertake a Network-wide training programme inclusive of research activities in at least 2 EU countries, short courses at 5 Network Schools, and a series of dissemination and public outreach actions, with the fundamental goal of forming a group of young scientists and practitioners who will play a key role in the water sector at the European scale. The ESR post advertised here is one of these 15 positions. Its main role is to undertake training and research on a specific project 'ESR05 - Hydrodynamics of swimming fish: drag, propulsion, and fish bioenergetics'.



## Job description

### *Main purpose of the role:*

This post is based within the School of Engineering and is a part of the Marie Curie European Training Network 'RIBES'. Fish hydrodynamics influences nearly all aspects of fish life-cycles and thus has significant implications for fish conservation. Nevertheless, precise aspects of fish swimming mechanics remain largely unknown and many fundamental questions are still the subject of debate. This post project 'ESR05 - Hydrodynamics of swimming fish: drag, propulsion, and fish bioenergetics' will focus on fundamental aspects of flow-fish interactions using laboratory experiments and employing advanced facilities and instrumentation. Among others, the project will investigate the links between turbulence dynamics, fish propulsion, drag, and bio-energetics. The experiments will employ state-of-the-art techniques in fish tracking and flow measurement such as a custom-made robotic multi-camera 200Hz Particle Image Velocimetry (PIV) system allowing simultaneous high-resolution stereoscopic measurements of both fish movement and 3D velocity fields near moving fish and far away. The obtained data will be used to (i) identify key flow patterns, drag-forming mechanisms, and propulsion strategies in controlled conditions; (ii) quantify locomotor dynamics that maximize swimming performance and assess potential implications for fish bioenergetics; and (iii) develop a new framework where fish biomechanical properties can be used in designing safe fish passages through a variety of hydraulic structures in rivers. The project will advance fundamental knowledge on flow-fish interactions by pursuing two key objectives: (1) to enhance current capabilities to measure turbulent flow fields in proximity of swimming fish; and (2) to identify key flow patterns, drag-forming and propulsion mechanisms for selected fish species, to be identified at the initial stage of the project. To help achieve these objectives, the successful candidate will have some background knowledge of fundamentals of fluid mechanics, fish biology and physiology, laboratory experimentation, instrumentation, and computations.

### At a glance

**Salary:**

£36,096 Per annum plus  
Monthly Mobility allowance

**Hours of work:**

Full time

**Contract type:**

Available for 36 months

### *Key responsibilities:*

#### **Research Assistant (Early Stage Researcher)**

The list of typical duties include:

- Perform the theoretical analyses of flow-fish interactions
- Organise, prepare and conduct experiments when required
- Develop and test data analyses routines when required
- Conduct data analyses and contribute to physical interpretations
- Contribute to conference and journal papers
- Undertake administrative responsibilities associated with the project as required
- Assist with the supervision of undergraduate project students as required

Also, all network trainees will be involved in activities to improve public understanding of their research:

- Marie Curie Ambassadors: each researcher will be required to offer seminars or lectures to high school or undergraduate students.
- Open Days: a group of local School pupils will be invited to spend a day with the network researchers and to visit research facilities or field sites.
- Documentary release: a scientific documentary will be produced including interviews with the network fellows and participants.



## Candidate background

### *Requirements:*

#### *Degree:*

- BEng/MSc/MEng in Engineering (either mechanical, environmental, civil, bio-engineering, or aerospace; BSc/MSc in Biological Sciences (Fish Biology and Physiology specialization is preferable); or BSc/MSc in Physical Oceanography
- *Applications from candidates not yet graduated by the call deadline (with Diploma foreseen at the latest by the end of July 2020) are accepted*

#### *Specific mandatory skills:*

- General mathematical and physics skills (advanced statistics is an advantage)
- Programming skills using Matlab, C++ and/or other computing languages

#### *Specific desirable skills:*

- Fish handling skills
- Operating skills for Particle Image Velocimetry (PIV) systems

#### *Specific requirements of the Doctoral School:*

Entrance requirements for a PhD candidate at the University of Aberdeen are either a Master's degree or a first or upper-second class Honours degree in an appropriate area from an approved university (or an equivalent qualification, see <https://www.abdn.ac.uk/study/international/inmycountry/index.php>). To study for a degree at the University of Aberdeen it is essential that you can speak, understand, read, and write English fluently. These skills will allow you to understand lectures, produce high standards of written work, and perform well in examinations. If you hold a degree from a UK University, then evidence of proficiency in English language may not be required. If your degree is not from a UK University, then some evidence of English knowledge and skills needs to be provided (see details at <https://www.abdn.ac.uk/study/international/requirements-pg-266.php>).

#### *Mobility rule:*

Applicants must not have resided or carried out their main activity (work, studies, etc.) in UK for more than 12 months in the 3 years immediately before the recruitment date. Compulsory national service, short stays such as holidays, and time spent as part of a procedure for obtaining refugee status under the Geneva Convention are not taken into account.



## Terms of appointment

Salary will be paid at the rate of £36,096 per annum. Individuals will also be provided with a monthly mobility allowance. [Select Grade](#)

Any appointment will be made subject to satisfactory references and a 12 month probation period.

As this position is funded by the European Commission it is available for 36 months.

**Gross salary: living allowance 3.270\* €/month (39.240\* €/year) + mobility allowance 600 €/month (7.200 €/year)** (+ 6.000 €/year family allowance if applicable)

*\* multiplied by country correction coefficient of the country where the researcher is recruited; the gross salary is subject to compulsory deductions following applicable national regulations of the country in which the researcher is recruited (such as social security contributions and direct taxes)*

**Starting date** is negotiable with the host institution in the **second semester 2020** (from June to December 2020), also taking into account potential travel restrictions related to COVID-19. Enrolment in the Doctoral Schools is foreseen by December 2020.

For further information on various staff benefits and policies please visit [www.abdn.ac.uk/staffnet/working-here](http://www.abdn.ac.uk/staffnet/working-here)

Should you require a visa to undertake paid employment in the UK you will be required to fulfil the minimum points criteria to be granted a Global Talent Visa. As appropriate, at the time an offer of appointment is made you will be asked to demonstrate that you fulfil the criteria in respect of financial maintenance and competency in English. Please do not hesitate to contact Heather Clark, HR Adviser on [h.m.clark@abdn.ac.uk](mailto:h.m.clark@abdn.ac.uk) for further information.

# Person specification

	Essential	Desirable
Education/Qualifications	<ul style="list-style-type: none"> <li>BEng/MSc/MEng in Engineering (either mechanical, environmental, civil, bio-engineering, or aerospace; BSc/MSc in Biological Sciences (Fish Biology and Physiology specialization is preferable); or BSc/MSc in Physical Oceanography</li> <li>Applications from candidates not yet graduated by the call deadline (with Diploma foreseen at the latest by the end of July 2020) are accepted</li> </ul>	
Work and Other relevant experience (including training)	<ul style="list-style-type: none"> <li>General mathematical and physics skills (advanced statistics is an advantage)</li> <li>Programming skills using Matlab, C++ and/or other computing languages</li> </ul>	<ul style="list-style-type: none"> <li>Fish handling skills</li> <li>Operating skills for Particle Image Velocimetry (PIV) systems</li> </ul>
Personal qualities and abilities	<ul style="list-style-type: none"> <li>Excellent written, oral and presentation skills.</li> <li>Excellent skills to develop strong relationships with colleagues representing different disciplines (hydraulics, biology, environmental sciences) partners and/or with academics and researchers from other institutions and disciplines.</li> <li>Ability and willingness to work in a multidisciplinary environment.</li> <li>Ability and willingness to engage in dissemination of scientific outputs</li> </ul>	
Other	<ul style="list-style-type: none"> <li>Applicants must not have resided or carried out their main activity (work, studies, etc.) in UK for more than 12 months in the 3 years immediately before the recruitment date. Compulsory national service, short stays such as holidays, and time spent as part of a procedure for obtaining refugee status under the Geneva Convention are not taken into account.</li> </ul>	

## The University

*Founded in 1495, Aberdeen is Scotland's third oldest University and the fifth oldest in the UK. Ranked within the world top 160 in the Times Higher Education Rankings 2019 and named Scottish University of the Year in the Times and Sunday Times Good University Guide 2019. Aberdeen is 'open to all and dedicated to the pursuit of truth in the service of others'.*

Aberdeen is a broad based, research intensive University, which puts students at the head of everything it does. It has significant academic strengths and potential across a wide variety of disciplines. Outstanding in a wide range of discipline areas, Aberdeen has also been credited for its international reach and its commercialisation of research ideas into spin out companies.

The University has over 14,000 matriculated students and 3,600 staff representing 130 nationalities. We encourage bold thinking, creativity and innovation and we nurture ambition with many opportunities for professional and personal development in an inclusive learning environment which challenges, inspires and helps every individual to reach their full potential.

The University combines a distinguished heritage with a forward looking attitude. In the past few years, the University has encouraged creativity in its academic staff, broken new ground with an innovative curriculum, and developed state-of-the-art facilities including the new Sir Duncan Rice Library and the Aberdeen Sports Village and Aquatics Centre. In looking to the future, the University seeks to enhance its reputation as one of the world's leading Universities by moving forward with ever more ground breaking research; ensuring students have an intellectual and social experience second to none; and capitalising upon the dual role as one of the major institutions of the north and as a cornerstone of regional economic and cultural life.

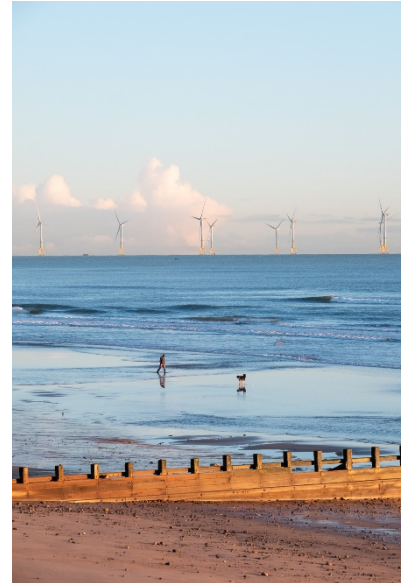
# Aberdeen

From its position high on the east coast of Scotland, Aberdeen has exerted its influence right around the planet. Our long and proud tradition of invention and discovery – from subsea technology and the discover of insulin, to treatments for Cystic Fibrosis and even the first MRI scanner – demonstrated a fundamental element of our region's DNA, to blaze new trails and shape the future for all of humankind. We're open to the world.

We may be known as Europe's oil and gas capital, but we are so much more. Our impact is felt all around the globe. We are at the forefront of a global energy transition to a lower carbon world. We are recognised as an important centre for life sciences. Our health research is world-leading. And we are home to food and drink brands that are enjoyed right across the planet.

Ours is not just an illustrious history of global influence and, more recently, leadership in the oil and gas sector. Aberdeen has moved seamlessly into scientific, engineering, digital and low carbon specialisms. The city has one of the largest concentrations of life scientists in Europe and the largest biologics cluster in the UK after Cambridge.

Perhaps there's something in Aberdeen's culture that has always made it a magnet for global innovators – the city boasts no fewer than five Nobel Prize winners. It was back in 1922 that one of these winners, biochemist John MacLeod, helped to discover insulin. And Aberdeenshire-born physician Patrick Manson made the momentous discovery that malaria is spread by mosquitoes, credited as one of the most important medical breakthroughs of its time.



That drive and dynamism continues apace, and today we have Europe's largest single-site health campus, where ground breaking research into cures for contemporary diseases is being carried out.

Aberdeen faces forward. It's a place that gets on with it. Ours is a small European city region with a big personality, punching well above its weight. We don't wait to see what others are doing and how they're doing it; we drive on with the business of innovation and don't stop when we hit the coast.



## Supporting Facts:

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Aberdeen has one of the largest concentrations of life scientists in Europe.

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Aberdeenshire is a global centre for subsea technologies and expertise. In fact, 75% of the world's subsea engineering capability is based here.

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Aberdeen is the centre of a UK industry that has, over 50 years, invested almost £500 billion in extracting oil and gas from the North Sea. Our skills and expertise have played a vital part in recovering the 20 billion barrels remaining in the UK Continental Shelf.



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Breakthrough research in Alzheimer's, Cystic Fibrosis and Irritable Bowel Syndrome is taking place here in Aberdeen.

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With regular connections to over 40 international and domestic destinations, Aberdeen International Airport looks after more than three million passengers each year, travelling right across the world.

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Robert Thomson, from Stonehaven, was the acknowledged inventor of the fountain pen and original inventor of the pneumatic tyre.

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The first written evidence of a game where the ball is passed from player to player to score goals appears in a book from Aberdeen dated 1633.

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George Paget Thomson was professor of natural philosophy in Aberdeen when he discovered the electron, for which he was awarded the Nobel Prize in physics in 1937.

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The role of mosquitos in spreading malaria was discovered by Aberdeenshire physician Sir Patrick Manson, known as the 'Father of tropical medicine'.



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Aberdonian inventor and energy pioneer Robert Davidson built the world's first known electric locomotive here in 1837.

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Sir Thomas Sutherland, the founder of the Hong Kong and Shanghai Banking Corporation, now known as HSBC, was born in Aberdeen and studied at the University of Aberdeen.

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Aberdeen has UNESCO-recognised archives – the oldest and most complete collection of records of any Scottish town.

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The terraces of the Houses of Parliament and the original Waterloo Bridge in London were constructed with Aberdeen granite.

## How to apply

Application forms and procedure are available at <https://www.msca-ribes.eu/recruitment>

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The closing date for receipt of applications is 09 June 2020

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Should you wish to make an informal enquiry please contact

Vlad Nikora

01224 273830

[v.nikora@abdn.ac.uk](mailto:v.nikora@abdn.ac.uk)

Please do not send application forms or CVs to [Vlad Nikora](#)

**Please quote reference number ENG153R on all correspondence**

*The School of Engineering welcomes a diverse working environment and recognises the benefits this can bring. We are keen to receive applications from individuals from across all of the equality protected characteristics (race, gender, disability, gender reassignment, age, sexual orientation, religion/belief, pregnancy/maternity, marriage/civil partnership).*

*The University supports opportunities for flexible working for a range of reasons and has policies in place to facilitate this. The policies can be found here:*

<https://www.abdn.ac.uk/staffnet/working-here/flexible-working--5607.php>

*The University's commitment to gender equality has been recognised through the achievement of an Athena SWAN Bronze award. The University is also a Stonewall Diversity Champion to further LGBT equality and a Disability Committed Employer recognising our commitment to supporting disabled staff and students.*

<https://www.abdn.ac.uk/staffnet/governance/equality-and-diversity-277.php>