



# Novel Eddy Current Array Sensing (KTP Associate)

Department	Electronic and Electrical Engineering ( <a href="http://www.strath.ac.uk/engineering/electronicalelectricalengineering/">www.strath.ac.uk/engineering/electronicalelectricalengineering/</a> )		
Faculty	Faculty of Engineering ( <a href="http://www.strath.ac.uk/engineering/">www.strath.ac.uk/engineering/</a> )		
Staff Category	Knowledge Transfer Partnership (KTP)	Reference No	615041
Reports To	Dr Ehsan Mohseni, (Knowledge Base Supervisor); Ian Gough (Company Supervisor)	Grade	RS79
Salary Range	Up to £38,000	Contract Type	36 months
FTE	1 (37.5 hours/week)	Closing Date	16/06/2024
Holidays	25 days per annum plus statutory holidays		
Pensions	Contributory pension scheme available to all staff including generous employer contribution.		
Training	KTP Associates spend 10% of their time on training and personal development including attendance at 2 compulsory Residential Modules. Professional Development with <a href="#">Organisational and Staff Development Unit</a> (OSDU) plus external training if required.		

## Job Advert

The Department of Electronic and Electrical Engineering in partnership with ETHER NDE Ltd (<https://ethernde.com>) are seeking to appoint a KTP Associate to develop eddy currents array sensor capability for non-destructive applications at high temperatures. The post will be predominantly based at ETHER's site in St Albans, Hertfordshire with visits to the University of Strathclyde campus.

ETHER NDE designs, manufactures, and sells Eddy Current Electronic Hardware and Firmware and Eddy Current Probes for the Non-Destructive Testing (NDT) market. They are the only UK manufacturer of Eddy Current NDT equipment. ETHER's in-house R&D team have developed a full range of flaw detectors over the years targeting a diverse range of industry sectors such as aerospace, manufacturing, oil & gas, power generation and transportation. These instruments are engineered to provide high inspection performance and measurement reliability for surface and subsurface defect detection, conductivity measurement, fastener/bolt holes/rivet holes inspection. With current industrial manufacturing trend focused on new processes such as additive manufacturing, ETHER's ambition is to lead in the competition and develop a solution for in-process inspection of AM and weld at high temperatures. Also, driven by the demand for increased coverage and inspection speeds, the KTP aims to develop an eddy current array sensor capability that can operate at sustained high temperatures to inspect AM and weld components during manufacturing for potential defects. This novel technology will help ETHER to expand its market and remain at the cutting edge of electromagnetic NDT.

The project is part of the Knowledge Transfer Partnership (KTP) programme that aims to help businesses to improve their competitiveness and productivity through the better use of knowledge, technology and skills that reside within the UK knowledge base. Successful Knowledge Transfer Partnership projects are funded by UK Research and Innovation through Innovate UK and are part of the government's Industrial Strategy. To find out how KTP works and the vital role you will play if you successfully secure a KTP Associate position please visit: [www.ktpws.org.uk](http://www.ktpws.org.uk)

The position offers the KTP Associate the following benefits:

- a challenging and rewarding job with real responsibility.
- a planned programme of training courses, including a £6k personal development budget.
- mentoring from experienced industrial and academic supervisors
- the support and resources of the University of Strathclyde
- the possibility of registering for a higher degree with the University
- the potential for good career development with the company at the end of the scheme
- developing and proving expertise in the prospering fields of renewable energy and remanufacturing
- the opportunity to make important and tangible improvements in an ambitious and dynamic company.
- the opportunity to create foundations with the organization to develop new business models.
- Apply your academic knowledge to a real-life challenge.
- Own your own project and bring about positive change by bridging the academia and business world.

The objective of this project is to expand the existing eddy current capability at Ether NDE into multi-element arrays that can perform at elevated temperatures allowing the company to expand its services in manufacturing. Opportunities exist to develop the electronics for transmit/receive topology of the array, investigate a wide range of cooling systems for the sensor, and test the prototype during AM or weld process at the university facilities. The associate will work with Ether NDE and Strathclyde to develop conceptual design, detailed system design, and prototypes for testing.

To be considered for the role you will be expected to have a PhD degree in Electronic/Mechanical Engineering, Physics or equivalent. The successful candidate will have experience in electromagnetic instrumentation and inspection. For a full list of role requirements please see the person specification below.

## Job Description

### Brief Outline of Job:

Working with colleagues at Ether NDE and academics at the University of Strathclyde the associate will undertake a 3-year program of work that will look to develop new eddy current array sensor technology for Ether NDE's product portfolio. Areas to consider include:

- Most of the current eddy current probe range at Ether NDE are pencil probes with small footprint/coverage. The company's aim is to build eddy current array capability, which provides wider coverage, custom excitation topology, and faster inspection rates by the end of KTP.
- Desired array sensor should be equipped with active cooling system and materials resistant to high-temperature operation environment or inspection surfaces.
- Desired array sensor technology might be manufactured on flexible material/backing to comply to complex surface geometries.

The associate will leverage simulation tools at the university to design prototype concept eddy current arrays using Ether NDE's impressive suite of fabrication facilities and test them in real-case scenarios at high temperature welding/AM at university facilities.

The Associate will also contribute to the knowledge base through training workshops and reports which will be the basis for journal publications. Consistent reference to literature and use of academic and industry expertise will ensure best practice and successful delivery.

### Main Activities/Responsibilities:

1.	Lead the project and manage the KTP
2.	Collate existing information on the work to date, technical requirements and business need
3.	Review and familiarise yourself with the academic literature
4.	Electromagnetism and Finite Element (FE) modelling: to design the core sensing module and optimise the design to maximise defect detection sensitivity through modelling software to desired application scenarios.
5.	Develop conceptual solution with high level systems engineering
6.	Perform detailed system design
7.	Produce a prototype device
8.	Validate the prototype in a lab setting, then perform field trials

9.	Software development: to design firmware to facilitate communication between system components and signal acquisition.
10.	Engage in continuous professional development within the University and Company as appropriate
11.	Dissemination of KTP outputs and industry engagement with Academic team (e.g. through publication and presentation of work at conferences, tradeshow and in peer reviewed journals)
12.	Develop training manuals
13.	Completion of all KTP training and the KTP Associate Final Report by the required deadline.
14.	Ensure proper project management and reporting requirements are met throughout.

## Person Specification

### Educational and/or Professional Qualifications

(E=Essential, i.e. a candidate must meet all essential criteria to be considered for selection, D=Desirable)

E1 Preferably a PhD in Electronics and electrical engineering, Physics or Mechanical engineering

### Experience

E2 A strong background in electromagnetism, knowledge of Eddy Currents (EC) testing

E3 Experience with the development of inspection instrumentation

D1 Prior experience in using eddy current sensors and controllers

D2 Experience working with industry

D3 Experience with electromagnetic modelling packages --CIVA, COMSOL and Ansys Maxwell

D4 Experience with Printed Circuit board designs, schematics, and layouts as well as FPGA programming

E4 Laboratory experience in setting up safe experimental measurements

E5 Signal processing - through either MATLAB, Python, or C

D5 Design, validation, testing - experience in developing products from design stage, using CAD software packages, to validation and testing

### Job Related Skills and Achievements

E6 Proficient in technical writing, and presentation

E7 Awareness of commercial drivers

E8 Proficient in electronics including circuit design and PCB layout

D6 Experience in materials science

D7 Proficient in firmware

D8 Proficient in eddy currents testing

### Personal Attributes

E9 Strong communication skills in English

E10 Strong project management skills (particularly communication, organisation, and leadership)

E11 Self-directed and self-motivated

E12 Good interpersonal and collaboration skills

## Application Procedure

Applicants are required to complete an application form including the name of three referees who will be contacted without further permission, unless you indicate that you would prefer otherwise. Applicants should also submit a Curriculum Vitae and a covering letter detailing the knowledge, skills and experience you think make you the right candidate for the job. Applicants should also complete the Equal Opportunities Monitoring Form.

## Other Information

Further information on the application process and working at Strathclyde can be found on our website (<http://www.strath.ac.uk/hr/workforus>).

Informal enquiries about the post can be directed to Dr Ehsan Mohseni, and Prof. Gordon Dobie Electronic & Electrical Engineering ([ehsan.mohseni@strath.ac.uk](mailto:ehsan.mohseni@strath.ac.uk), [gordon.dobie@strath.ac.uk](mailto:gordon.dobie@strath.ac.uk)).

### Conditions of Employment

Conditions of employment relating to the KTP Associate staff category can be found at: [Conditions of Employment](#).

### Rewards and Benefits

Our staff have access to a wide range of outstanding benefits that include financial rewards, family friendly and wellbeing benefits and career development opportunities, details of which can be found [here](#).

### Probation

Where applicable, the successful applicant will be required to serve a 6 month probationary period.

### Pension

The successful applicant will be eligible to join the Universities' Superannuation Scheme. Further information regarding this scheme is available from [Payroll and Pensions](#).

### Relocation

Where applicable, the University offers a relocation package to support new employees who meet the eligibility criteria. The relocation package is offered as a contribution towards costs incurred, and is designed to be flexible, allowing staff to use the financial support available in the way that will be most helpful to them. Further details are outlined in the Relocation Policy.

### Interviews

Formal interviews for this post will be held on a date to be confirmed.

### Equality and Diversity

The University of Strathclyde is a socially progressive institution that strives to ensure equality of opportunity and celebrates the diversity of its student and staff community. Strathclyde is people-oriented and collaborative, offering a supportive and flexible working culture with a deep commitment to our equality, diversity and inclusion charters, initiatives, groups and networks.

We strongly encourage applications from Black, Asian and minority ethnicity, women, LGBT+, and disabled candidates and candidates from lower socio-economic groups and care-experienced backgrounds.

### University Values

The University's Values capture what we're all about: who we are, what we believe in and what we stand for. [Our Values](#) have been derived from how we act and how we expect to be treated as part of Strathclyde.

