

Position Description

Group of research topics: Big data and Digital Twin in Ship Industry

Position is funded by	<ul style="list-style-type: none"> - COFUND, Marie Skłodowska-Curie Actions (MSCA), Horizon 2020, European Union - NAVANTIA S.A. S.M.E., Spain - RMIT University (RMIT), Australia
Research Host	University of A Coruña (UDC), Spain
Industry Partner	NAVANTIA S.A. S.M.E., Spain
PhD awarding institution/s	Dual PhD awarded by UDC and RMIT
Locations	<ul style="list-style-type: none"> - Primary: A Coruña, Spain - Secondary: Melbourne, Australia - Annual workshops in Barcelona, Spain
Contract	Full time, fixed term (36 months)
Gross annual salary	24.521,04 EUR
Preferred start date	1/11/2022
Deadline for applications	30/04/2022 (Reference: UDC-DC1)

Your choice of research topics (only one of these projects will be funded):

Project 1: Big data for shipyard 4.0: Data stream mining	Project 2: Streaming big data analytics for Shipyard 4.0	Project 3: The Digital Twin for the Evaluation of Ship Safety
<p>The project is aimed to perform mining of data coming from devices like sensors and buoys, which have great relevance with quality assurance in the ship building process. Specific research issues include: (i) analysis of feature- and distance-based methods for effective clustering/classification of multidimensional time series data streams, (ii) identification and detection of anomaly behaviours, and (iii) introduction of techniques robust to the presence of noises/imprecise readings. <i>Further information may be obtained from the Supervisors.</i></p>	<p>Streaming big data generated by smart sensors can be exploited to trigger alarms for emergency situations and events in the manufacturing process. A challenge in analysing the streaming sensor data is the lack of semantics in the data streams. The project aims to design integrated technologies for decreasing the costs for ship monitoring, assessment and maintenance by collecting data from devices like sensors and buoys, processing and uploading to the data lake. <i>Further information may be obtained from the Supervisors.</i></p>	<p>The main objective of this PhD would be to develop the main points needed to set up a Digital Twin with the main goal of analysing and predicting the ship behaviour after damage. This digital twin should receive data from the real vessel and the environment, and generate information regarding the status of the ship, which would be of great interest for the ship master as a tool to take data-based decisions and which would help in the case of an accident. <i>Further information may be obtained from the Supervisors.</i></p>

Supervisors: <u>Prof. Jose Antonio Vilar-Fernandez (UDC) and Jenny Zhang (RMIT) and Industry Supervisor José Luis González Leal (NAVANTIA)</u>	Supervisors: <u>Prof. Amparo Alonso-Betanzos (UDC) and Jenny Zhang (RMIT) and Industry Supervisor José Luis González Leal (NAVANTIA)</u>	Supervisors: <u>Prof. Marcos Miguez González, Dr. Vicente Díaz-Casas (UDC) and Jenny Zhang (RMIT) and Industry Supervisor José Luis González Leal (NAVANTIA)</u>
Research Fields: Mathematics, statistics and analytics, Data science, Machine learning, Artificial intelligence and Data analytics	Research Fields: Artificial intelligence, Machine learning, Data Analytics and Data science	Research Fields: Artificial intelligence, Support systems, Naval architecture and Industry 4.0

REDI

The REDI (RMIT European Doctoral Innovators) program is a unique opportunity offering excellent PhD conditions including enviable international experience, top-class research discipline and transversal skills training as well as networking with-academic and industry leaders across 60+ supporting partners and 11 countries.

As a REDI researcher you will be:

- enrolled by two entities, with the chance to be awarded dual doctorates and gain alumni status from multiple institutions, including the Marie Curie Alumni Association.
- seeing the world and spending a year at RMIT University in Melbourne, Australia (ranked in the top 20 of universities under 50 years old in the world).
- part of a rich multidisciplinary network of researchers and supervisors who come together in annual, week-long training events in Barcelona.
- working closely with industry and gaining experience with the 40+ leading companies supporting the program.
- earning a salary above national standards for doctoral positions with full social security benefits (with further support available for eligible researchers with additional needs).
- receiving support and guidance from two highest-calibre, experienced supervisors with high PhD completion rates.
- enhancing your career prospects through comprehensive technical and transversal skills training from leading institutions, intersectoral and international experience and mentoring.
- working on innovative and exciting projects of high commercial and societal value with up to four years to complete your research.

For more information visit: rediprogram.eu

Are you REDI? (Expected Profile)

Project 1

Your background and skills: You should have a Bachelor or/and Master's degree in Statistics, Data Science, Computer Science, Artificial Intelligence, Mathematics or related quantitative fields. You should have a strong background on data analysis, particularly knowledge in time series analysis, multivariate analysis and statistical/machine learning algorithms. Excellent computer programming skills, with ability to develop solid code in R and/or Python are also required.

Your work experience: Professional experience is not required.

Your research experience: Research experience is not required but having participated in research tasks/projects related to data management, statistical programming and mining of complex data is welcome.

Facilities provided within the project's framework: CITIC facilities (<https://citic.udc.es/en/home-english-2/>) and the resources of the MODES research group (<https://investigacion.udc.es/en/Research/Details/G000199/>) at the Mathematics Department in University of A Coruña (<https://www.fic.udc.es/>)



Project 2

Your background and skills: You should possess a background on Computer Science, with knowledge on data analytics and machine learning.

Your work experience: Professional experience is not required.

Your research experience: Research experience is not required, some experience on data acquisition and preparation and machine learning in stream data is recommended. Also, text mining will be a plus.

Facilities provided within the project's framework: CITIC facilities (<https://citic.udc.es/en/home-english-2/>) and the resources of the LIDIA research group (<https://investigacion.udc.es/en/Research/Details/G00074>) at the Computer Science Department in University of A Coruña (<https://www.fic.udc.es/>)

Project 3

Your background and skills: You should possess a background is Mechanical Engineering / Naval Architecture or Computer Science/Electronic Engineering, considering that the topics of this PhD include the development of an intelligent system where there is a need for data processing/analysis and development of numerical models of a specific use case, which should be related to ship motions. However, in the latter cases the candidate should be capable of independently work on acquiring knowledge regarding the first PhD.

Your work experience: Professional experience is not required.

Your research experience: Although research experience is not strictly needed, some experience in the development of control systems, sensing devices and data processing, and naval architecture (analysis of ship motions) could be recommendable.

Facilities provided within the project's framework: Workshops and labs of the Campus Industrial in Ferrol (Spain), including towing tank and other facilities (<https://www.udc.es/en/campusindustrial/>).

Employment Benefits and Conditions

UDC offers a 36-month full-time position (extendable up to 48 months in duly justified cases), indicatively starting on 1/11/2022. The position will be based in A Coruña (Spain). International travel is foreseen to Australia (up to 12 months). There is no probation period and there are 37.5 working hours per week.

The remuneration, in line with the European Commission rules for Marie Skłodowska-Curie grant holders, will consist of a gross annual salary of est. 24.521 EUR. Of this amount, the estimated net salary to be perceived by the Researcher is 1.700 EUR per month. However, the definite amount to be received by the Researcher is subject to national tax legislation. For more information on the estimated monthly net salary, use the [net salary calculator](#).

Benefits include:

- Paid holiday leave
- Sick / injury leave
- Health insurance
- 1,000€ yearly travel allowance to cover flights and accommodation to participate in the annual workshop at RMIT Europe in Barcelona (Spain).
- 10,000€ allowance to cover flights and living expenses for up to 12 months in Australia.

For more details, please see: <https://estudios.udc.es/en/doctorates>



REDI to apply? First a little more about us...

UDC

The University of A Coruña (UDC) was founded under the Galician Universities Law 11/1989 on July 20th, 1989. UDC is territorially situated in the Campus of A Coruña and the Campus of Ferrol, Spain. It is a public institution whose primary objective is the generation, management and dissemination of culture and scientific, technological and professional knowledge through the development of research and teaching. UDC conceives its essential purpose as a quality public service aimed at achieving greater levels of welfare for the group of the society through the pursuit of social, scientific and technological advances in a framework of ethical values.

UDC offers to its Doctoral Students a wide range of benefits, including:

- **Mentoring program:** Each Doctoral Student is assigned to an academic tutor to facilitate the relationship between the student and the PhD programme. In addition, each Doctoral Student has a thesis supervisor.
- **Courses and training opportunities:** Doctoral candidates are entitled to apply to a range of doctoral (<https://www.udc.es/es/cufie/UFA/PAI/cronograma/>), language (<http://www.centrodelinguas.gal/#>), TIC (<https://udc.gal/en/afi/>), and summer courses (<https://www.fundacion.udc.es/formacion.asp?idioma=EN>)
- **Language courses:** UDC offers Spanish courses for foreigners (offered every term, free). Also, English, German, French, Italian, Portuguese are offered every term (various levels). For further information, visit: <http://www.centrodelinguas.gal/#>
- **Relocation support:** The University of A Coruña offers accommodation places in the public university halls of residence for students studying at both the A Coruña and Ferrol campuses. Both residences are very centrally located and have single and double rooms, study rooms and leisure rooms. Further information about the call and other accommodation options: <https://udc.gal/en/sape/aloxamento/>
- **Cultural and social activities:** For information on cultural activities offered by the University of A Coruña see <https://udc.gal/en/cultura/>
- **Further benefits:** The University of A Coruña has a number of sport facilities available to its students. See <https://udc.gal/en/deportes/>

For more information, visit: <https://www.udc.es/en/>

RMIT

RMIT is a global university of technology, design and enterprise, ranked in the top 20 of universities under 50 years old in the world. World-class people, leading edge resources, collaboration with industry partners and multi-disciplinary approaches are just a few of the trademarks of research at RMIT, which boasts almost 90,000 students and campuses in Australia, Vietnam, a centre in Barcelona, Spain and research and industry partners on every continent.

As Doctoral Student at RMIT you will be able to benefit from a wide range of training and mentoring opportunities including:

- **The PhD Up** program offering a huge range of workshops, seminars and short courses to build research knowledge and skills, including research writing, publishing, research methods, ethics, project management and careers (see more at: <https://www.rmit.edu.au/students/student-essentials/information-for/research-candidates/enriching-your-candidature/phd-up-program>)
- **RMIT PhD Online Modules**, designed specifically for PhD students, including *Researching your literature review*, *Writing a research proposal*, *Choosing where to publish*, *Writing for Publication*, *Research Integrity*, etc.
- **RMIT Creds**, RMIT's Digital Credentials Platform, which includes over 80 credentials covering a wide range of topics such as *Understanding Responsible Research and Innovation*, *Academic Integrity Awareness*, *Emotional Intelligence*, *Diversity Matters*, *Agile Ways of Working*, *Why Gender Matters*, *Cross Cultural Communications*, etc. (see more at: <https://www.rmit.edu.au/study-with-us/levels-of-study/short-courses/>);
- **The e-Grad School**, the online learning modules of the Australian Technology Network (ATN) of Universities' covering a multitude of transferrable skills such as *Critical and Creative Thinking*, *Leadership and Communication*, *Entrepreneurship*, *Research Commercialisation*, *Public Policy*, etc.

- **The RMIT Mentoring platform also** gives you access to mentoring from trained professionals and experts, including:
 - o *Career Mentoring* - career guidance from industry professionals from all disciplines and global locations.
 - o *Women@RMIT Mentoring* - career guidance from industry professionals who are committed to gender diversity and equality in the workplace (especially for female students in male dominated industries)
 - o *Pride Mentoring* - a chance for students who identify as LGBTIQ+ to receive professional and social guidance from industry professionals who also identify as LGBTIQ+ or are familiar with the additional challenges these groups face in the workforce.

Find out more: rmit.edu.au

NAVANTIA

Navantia is a highly technological company that invests more than 9% of the annual income in R&D+I, well ahead of other industrial sectors average. This allows Navantia to have its own technological capacity, a key factor to produce efficient, competitive and exportable products and services as well as to continuously improve its processes and facilities.

To keep the level of investment in R&D+I, Navantia works together with national and international partners and technologists and relies on collaborative agreements with leading universities and technology centers in Spain. In this framework, 4 chairs have been established with universities in Madrid, Cartagena, Cádiz and A Coruña. Furthermore, given its nature of international company, Navantia holds agreements with universities and technology centers in Australia and other countries, and also collaborates with reference sectoral agencies in several countries.

Navantia is currently involved in the development and implementation of digital twins of naval ships, designed to fulfil specific tasks and scenarios.

Navantia will be supporting the Researcher. Navantia has been working in the last years in the development and implementation of Industry 4.0 tools within its productive processes and recently within its products. Navantia will be involved in the research project by providing practical support to the Researcher (sample cases, real operational data, application details, etc.) and theoretical support from their systems engineers.

For more information, visit: <https://www.navantia.es/es/>

A little more about you...

Eligibility

You need to fulfil criteria of the REDI program and both universities to be recruited.

To apply for REDI, you must comply with the MSCA-COFUND general eligibility criteria:

- **Be in the first four years Full-Time Equivalent (FTE) research experience** of your research career and not yet have been awarded a doctoral degree. FTE Research Experience is measured from the date when a researcher obtained the degree entitling him/her to embark on a doctorate, **AND**
- **Not have resided or carried out your main activity (work, studies, etc.)** in the country of your research host for more than 12 months in the 3 years immediately before this call's deadline. Time spent as part of a procedure for obtaining refugee status under the Geneva Convention (1951 Refugee Convention and 1967 Protocol), compulsory national service and/or short stays such as holidays is not taken into account.

AND the following criteria:



- **Hold a bachelor's degree requiring at least 4 years of full-time study** in a relevant discipline awarded with honours and including a research component; **OR**
- **Hold a master's degree that includes a research component** or a master's degree without a research component with at least a high distinction average; **OR**
- **Have evidence of appropriate academic qualifications and/or professional experience** demonstrating that the applicant has developed knowledge of the field of study or cognate field and the potential for research sufficient to undertake the chosen project.

AND

- Have **English level C1 language proficiency**.

In addition to the above, if your application is successful, you will be required to:

- Apply for a working/student visa in Spain (More information: <http://www.exteriores.gob.es/Portal/en/ServiciosAlCiudadano/InformacionParaExtranjeros/Paginas/VisadosDeLargaDuracion.aspx>)
- Apply for a student visa in Australia (More information: <https://www.rmit.edu.au/study-with-us/international-students/apply-to-rmit-international-students/student-visas/apply-for-a-visa>)

In addition to meeting the eligibility criteria for the REDI Program, you will also need to meet the admission criteria of both institutions:

Admission at UDC

You will be enrolled as Doctoral Student at UDC for the entire duration of the assignment. At admission, you will need to supply:

- Degree certificate and the transcript of records of a Bachelor and Master's degree. At least 300 ECTS (bachelor + master). Of these, at least 60 ECTS must be from a master's degree. Students with non-EU degrees must apply for a Rector's resolution on the equivalence between their foreign degrees and those awarded by EHEA's institutions.
- Proof of B2 level of English according to the European Framework of Reference for Languages (CEFR). It is also recommended (not compulsory) to be able to communicate in Spanish and/or Galician.

PhD studies are arranged into several PhD programs. Students must choose a particular program when applying for admittance to doctoral studies. Programs may have a particular set of requirements depending on their research field. Specific requirements are detailed in the web page of each particular program.

More information: <https://estudios.udc.es/en/doctorates>

Admission at RMIT

You will also be enrolled as Doctoral Student at RMIT for the entire duration of the assignment. At admission, you will need to supply:

- CV
- Complete transcripts for all academic qualifications
- Research proposal or statement of interest in an available research project
- Language certificates
- List of referees

More information: <https://www.rmit.edu.au/research/research-degrees/how-to-apply>

Apply now (<https://www.rediprogram.eu/>)

