

## Position Description

**Group of research topics: Advanced Air Mobility, eVTOL aircraft, certification by simulation, airspace risk analysis, environmental sustainability**

<b>Position is funded by</b>	<ul style="list-style-type: none"> <li>- COFUND, Marie Skłodowska-Curie Actions (MSCA), Horizon 2020, European Union</li> <li>- Politecnico di Milano (POLIMI), Italy</li> <li>- RMIT University (RMIT), Australia</li> </ul>
<b>Research Host</b>	Politecnico di Milano (POLIMI), Italy
<b>PhD awarding institution/s:</b>	Dual PhD awarded by POLIMI and RMIT, University
<b>Locations</b>	<ul style="list-style-type: none"> <li>- Primary: Milan, Italy</li> <li>- Secondary: Melbourne, Australia</li> <li>- Annual workshops in Barcelona, Spain</li> </ul>
<b>Contract</b>	<b>Full time, fixed term (36 months)</b>
<b>Gross annual salary</b>	26.500,00€ (gross amount before employee's taxes and contributions)
<b>Preferred start date</b>	01/11/2022
<b>Deadline for applications</b>	30/04/2022 (Reference: POLIMI-DC4)

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

Project 1: Certification by simulation for advanced air mobility	Project 2: Airspace risk analysis and evaluation for advanced air mobility with eVTOL aircraft	Project 3: eVTOL aircraft pilot abnormal behaviour identification and prediction with wearable sensors
<p>Advanced Air Mobility (AAM) is referred to a set of vehicles that provide air transport services in a metropolitan area using powered-electric vertical take-off and landing (eVTOL) aircraft. Several companies are developing eVTOLs to replace helicopters when the time is right. AAM offers opportunities for the cities of the future, but it presents several challenges.</p> <p>The project focuses on the development of eVTOL digital twin models to be used for vehicle certification, able to evaluate mobility</p>	<p>The project focuses on airspace risk analysis and evaluation for advanced air mobility with eVTOL aircraft. Safety is paramount in aviation operation. Emerging aviation operations with eVTOL in low altitude airspace bring challenges to airspace risk management. Complexed operational environment and new avionics technologies on board require a new safety risk analysis and evaluation methodology, which may totally be different from</p>	<p>The project focuses on identify the abnormal behaviours of eVTOL aircraft pilot during the flight missions. Pilots play an important role in future advanced air mobility. Complexed and dense operational environment around hot spot areas may cause eVTOL aircraft pilots' fatigue and then perform some abnormal behaviours, which bring dangers to the safe operation. By using wearable sensors, we could monitor the signal from pilots and help identify and predict those abnormal behaviour, to mitigation</p>



<p>schemes, emergency procedures, together with handling qualities and pilot's workload. The aeroelastic behaviour of these aircraft will be considered as well, to highlight potential aeromechanical instabilities, and to provide a robust tool including aeroelastic certification of the eVTOL critical parts. Further information may be obtained from the Supervisors. <i>Further information may be obtained from the Supervisors.</i></p>	<p>traditional commercial aircraft in high altitude airspace. Further information may be obtained from the Supervisors. <i>Further information may be obtained from the Supervisors.</i></p>	<p>the risks. The research experiments will conduct via flight simulator other than real flight activities. Numerical data collection and machine learning algorithm will be applied to generate real-time warnings if necessary. Further information may be obtained from the Supervisors. <i>Further information may be obtained from the Supervisors.</i></p>
<p><b>Supervisors:</b> Prof. Giuseppe Quaranta (POLIMI) <b>and:</b> Dr. Annie Liang (RMIT) and Dr. Vincenzo Muscarello (RMIT)</p>		
<p><b>Research Fields:</b> Aerospace engineering and aviation, digital twin models, safety and risk assessment, machine learning, structural dynamics and aeroelasticity</p>		

## 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 12 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](http://rediprogram.eu)

## Are you REDI? (Expected Profile)

### Project 1

**Your background and skills:** You should have a Master's degree in Aerospace engineering, with research interests in flight mechanics, structural dynamics and aeroelasticity of rotary-wing aircraft.

**Your work experience:** Professional experience is not required.

**Your research experience:** Research experience is not required.



## Project 2 and 3

**Your background and skills:** You should have a Master's degree in Aerospace engineering, with research interests in aircraft safety risk analysis, numerical simulation, machine learning, and data analysis.

**Your work experience:** Professional experience is not required.

**Your research experience:** Research experience is not required.

## Employment Benefits and Conditions

POLIMI offers a 36-months full-time work contract (extendable up to 48 months in duly justified cases), indicatively starting on 01/11/2022. The position will be based in Milan (Italy). International travel is foreseen, including to Australia (up to 12 months) and Spain (one week per year). No probation period is foreseen and the number of working hours per week is flexible.

The remuneration, in line with the European Commission rules for Marie Skłodowska-Curie grant holders, will consist of a gross annual salary of 26.500,00€ (gross amount before employee's taxes and contributions). Of this amount, the estimated net salary\* to be perceived by the Researcher is 23.000 EUR per year equivalent to an estimate monthly net salary of 1.900 EUR. However, the definite amount to be received by the Researcher is subject to national tax legislation.

*\*Net salaries can fluctuate in accordance with an individual's personal circumstances (marital status, age, disability, family and dependents, etc. The above indicative net salaries offer an approximation of what a single person in their early 20s could expect to receive in their bank account after taxes.*

### Benefits include:

- Sick leave
- Paid holiday leave
- Parental leave
- Access to the School of Architecture and Urban Design, RMIT University, Melbourne online resources, networks and facilities
- 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:

<http://www.dottorato.polimi.it/en/looking-for-a-phd/call-for-positions-and-scholarships/admission-requirements/index.html>

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

### POLIMI

Politecnico di Milano is a scientific-technological university which trains engineers, architects and industrial designers. The University has always focused on the quality and innovation of its teaching and research, developing a fruitful relationship with business and productive world by means of experimental research and technological transfer.

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

- **Mentoring program:** Along with the supervisors, Doctoral Students have an individual tutor that supports them through all the stages of their PhD career, including choice of the courses to be attended and dealing with any problem with the supervisor (or with other candidates)
- **Courses and training opportunities:** POLIMI offers training courses to its students. For more information, please visit <http://www.dottorato.polimi.it/en/during-your-phd/phd-level-courses/index.html>
- **Language courses:** The university offers Italian courses twice a year.



- **Relocation support:** Doctoral Students are offered for free the opportunity of using the Politecnico di Milano nursery service.
- **Cultural and social activities:** The Doctoral Students representatives organize, with the support of the PhD school, social and cultural events during the year (approx. 1-2 per month).
- **Engagement with industry:** the Doctoral Student will work with TXT e-Solutions ([www.txtgroup.com](http://www.txtgroup.com)), an international provider of software product and solutions based in Milan and branches in Italy, Germany, United Kingdom, France, Switzerland and USA. TXT focuses on two main business areas: specialized software products and advanced software engineering services for companies in the aerospace sector and automotive; quality testing and services in the banking sector. The Doctoral Student may benefit from specific training and mentoring opportunities (i.e. site visits, access to facilities and data, etc.).

For more information, visit: <https://www.polimi.it/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](http://rmit.edu.au)

## 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 eligibility criteria by the application deadline:

- **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 residence permit in Italy (More information: <https://www.polimi.it/en/international-prospective-students/life/residence-permit/>)
- 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 POLIMI**

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

- CV in PDF format

- PDF report illustrating the development of the chosen research project (minimum 4,000, maximum 8,000 characters).
- Degree certificate and transcript of records of an applicable higher university degree. Official translations in English are required in addition to the documents in the original language. Applications open to students holding an university degree obtained under the educational system in force prior to M.D. 509/1999, or a Laurea Specialistica (equivalent to a Master) obtained in accordance with M.D. 509/1999, or a Laurea Magistrale (equivalent to a Master) obtained in accordance with M.D. 270/2004, or similar academic qualifications obtained abroad that are equivalent in terms of duration and contents to the Italian qualifications and qualified as fit by the Selection Committee.
- Proof of B2 level of English according to the European Framework of Reference for Languages (CEFR) (FCE: B; IELTS: 6; TOEFL: paper based (total score): ≥ 547; computer based (total score): ≥ 210; internet based (total score): ≥ 78; TOEIC ≥ 720; Trinity College London ≥ ISE II)
- A Master's minimum qualification score applies. The minimum GPA per country is:

BANGLADESH	3,3/4
CHINA	70/100
COLOMBIA	3,5/5
European Countries (ECTS grading system)	C+
EGYPT	65/100
ETHIOPIA	3/4
GHANA	65/100
INDIA	70/100
INDONESIA	2,8/4
IRAN	14,5/20
NIGERIA	3/5
PAKISTAN	3,3/4,0
SERBIA	7,5/10
TURKEY	3/4
VIETNAM	7/10

Special restrictions apply to students having obtained their MSc in Universities of Applied Sciences.

More information: <http://www.dottorato.polimi.it/en/looking-for-a-phd/call-for-positions-and-scholarships/admission-requirements/index.html>

## Admission at RMIT University

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>)

