International PhD offer at INSA-Lyon and UNSW

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Offer Description

The Australia France Network of Doctoral Excellence (AUFRANDE) is a highly ambitious interdisciplinary doctoral program linking France and Australia, with a strong support from the industry. AUFRANDE seeks to recruit excellent doctoral researchers of any nationality, gender, and background from around the world.

AUFRANDE offers the recruited researchers an outstanding experience with excellent working conditions, including full-time employment contract in France with attractive salaries including social security benefits, a unique international research environment, and an innovative research training program in which they will deepen core scientific skills and develop new ones in complementary disciplines and sectors.

International mobility is a core feature of the program with a residential year in Australia and participation in regular events where researchers share common experiences and build a sustainable community, laying a strong foundation for long-term impact on future collaborations and careers.

Awarding institutions:

- Primary: INSA Lyon, France
- Secondary: UNSW Sydney, Australia

PhD title:

Digital-twins and artificial intelligence for robust machine condition monitoring

PhD description: Artificial intelligence (AI) has attracted immense interest in machine condition monitoring (MCM). The enthusiasm of researchers in this relatively new approach stems from its proven value in other image and signal processing applications, like computer-vision and speech recognition. Recent works have however highlighted the key difference of MCM from these more traditional AI applications: the scarcity of fault data. In MCM-intensive engineering applications, failure is often very expensive and prevented by strict maintenance procedures, resulting in just a handful of failure observations. Another complementary criticism that has been made to AI approaches to MCM is that they neglect decades of accumulated knowledge in degradation dynamics and machine reliability. A solution to these problems is offered by the combination of AI methods with digital twins.

The latter can produce large amount of data in any condition and codify knowledge about the machine behaviour. Yet, the portability of AI solutions developed in simulated environments to the real-world is still to be proven. A clear picture of the digital-twin characteristics which ensure this approach is successful is yet to be studied, and methods to combine scarce, yet valuable, experimental data with simulations have to be developed for MCM.

Research Fields: Applied science, mechanics, signal processing, machine learning

Supervisors:

- Professor Jerome Antoni, INSA-Lyon, France
- Prof. Zhongxiao Peng & A/Prof. Pietro Borghesani, UNSW Sydney, Australia
- Non-academic partner: SAFRAN-TECH, Paris Saclay

Benefits for recruited researchers include:

- Enrolment in a doctoral program in 2 entities in France and Australia, with the chance to be awarded dual doctorates;
- Work on innovative projects of high commercial and societal value;
- Be recruited in France under a full-time employment contract for a minimum period of 36-months;
- Earn an above-national standard salary including social security coverage;
- See the world with once-in-a-lifetime experiences, including a 6 to 12 months residential stay in Australia;
- Form part of a rich multidisciplinary network of researchers and supervisors;
- Work closely with industry leaders and gain experience with the AUFRANDE'S pool of industry supporters.

Requirements:

- Education Level: Master Degree or equivalent
- Languages: ENGLISH
- Level: Excellent
- Eligibility criteria:
  1. MSCA Early-stage Researcher rule: Applicants must have not yet been awarded a doctoral degree. Researchers who have successfully defended their doctoral thesis but who have not yet formally been awarded the doctoral degree will NOT be considered eligible to apply.
  2. MSCA Mobility rule: Applicants may not have resided or carried out their main activity (work, studies, etc.) in France for more than 12 months in the 3 years immediately before the call deadline (i.e., since 11 April 2020). Time spent as part of a procedure for obtaining refugee status under the Geneva Convention (1951 Refugee Convention and the 1967 Protocol), compulsory national service and/or short stays such as holidays are not taken into account.

3. MSCA Employment rule: Applicants may not be already permanently employed by the chosen Research Host at the time of call deadline.
4. Minimum level of studies: Applicants must meet the academic criteria for admission to the doctoral programs at both the French and the Australian enrolling universities.
5. English proficiency*: Applicants must have a demonstrable C1 level of English (both speaking and in writing).

Contact (please check that all eligibility criteria 1-5 are met before contacting us):

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