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:

AI-Assisted Condition Monitoring (AIA-CM) based on data-driven optimal signal processing

PhD description: Condition monitoring critically relies on signal processing for transforming the raw data (vibration, angular speed, strain, etc.) into interpretable features (scalar indicators, spectra, histogram, etc.). One everlasting challenge is to select the signal processing algorithms among a huge number of candidates, while the best choice is obviously case-dependent. Another challenge is to properly use signal processing algorithms, while they often rely on several critical hyperparameters whose optimal setting is again data dependent. The aim of this research project is to propose a solution to these issues, by making signal processing transparent to the user. It consists in developing a machine learning approach, where each algorithm together with its set of hyperparameters is seen as a probabilistic object in a Bayesian hierarchical framework. The idea is to simultaneously test several

candidate algorithms and select the best ones, or a combination of them, according to a given dataset, and to jointly update the values of the hyperparameters that most likely explain the data. The approach will be demonstrated for bid data processing, on open datasets consisting of large numbers of signals recorded on different machines.

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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Prof. Zhongxiao Peng: z.peng@unsw.edu.au