International PhD offer at INSA-Lyon

Position is funded by Marie Skłodowska-Curie Actions (MSCA), Horizon Europe, European Union.

Offer Description

MSCA Doctoral Networks will implement doctoral programmes, by partnerships of universities, research institutions and research infrastructures, businesses including SMEs, and other socio-economic actors from different countries across Europe and beyond.

MSCA Doctoral Networks are indeed open to the participation of organisations from third countries, in view of fostering strategic international partnerships for the training and exchange of researchers.

These doctoral programmes will respond to well-identified needs in various R&I areas, expose the researchers to the academic and non-academic sectors, and offer training in research-related, as well as transferable skills and competences relevant for innovation and long-term employability (e.g. entrepreneurship, commercialisation of results, Intellectual Property Rights, communication).

Proposals for doctoral networks can reflect existing or planned research partnerships among the participating organisations.

Awarding institutions:

- INSA Lyon, France

PhD title:

Physically-driven design of health indicators for diagnosis and prognosis

PhD description: The PhD project is about the design of novel Health Indicators (HIs), considering explicitly the physics of degradation. HIs are fundamental quantities at the basis of current diagnosis and prognosis methodologies of machines (e.g. windturbines, turbomachines, etc.). Despite remarkable progresses in health monitoring boosted by new technologies (IoT, new sensors) and AI, most approaches still rely on the use of rudimentary HIs defined more than half a century ago, when the main motivation was to provide metrics that could be easily calculated with the low computational resources of that time. Many popular HIs have traded simplicity against physical relevance and, as a consequence, it turns out difficult to tailor them to monitor specific degradation processes. Rather paradoxically, HIs with limited informational content are used as the inputs of extremely sophisticated machine learning algorithms (such as regressors and classifiers), yet constituting the weakest link of

the chain. The project will address the construction of a mathematical mapping from physical multidimensional quantities such as surface topology and local mechanical properties to a scalar metric that can be calculated from the measurement of the dynamic behavior of the structure. Models of tribology will be used to correlate the dynamic response of a structure to local properties of damaged surfaces of contact (gears, rolling element bearings). Fracture dynamics and fatigue models will be considered to construct metrics of damage. The methodologies will be tested, evaluated and validated experimentally using a testbench for fatigue analysis of rolling element bearings and tribometers.

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

Supervisors:

- Professor Jerome Antoni, INSA-Lyon, France
- 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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