

**Marie Skłodowska-Curie
Early Stage Researcher position
in the H2020 ETN project**

***SmartAnswer* :**

*Smart mitigation of flow-induced
acoustic radiation and transmission
for reduced aircraft, surface transport,
workplaces and wind energy noise*



A total of 15 PhD positions are available at 9 universities, 1 research centre and 3 industries, in the framework of the European Marie Curie European Training Network (ETN) *SmartAnswer*. This project aims at developing innovative technologies for flow and acoustic control, in a view to providing better passenger comfort and reduce the environmental impact in air and surface transportation, for quieter domestic appliances and systems on our homes and working places, and more sustainable wind energy production.

SmartAnswer is offering its young researchers an unprecedented training platform combining laboratory experiments, theoretical modelling, numerical simulations and optimization. They will be confronted with the constraints (manufacturing, economic, ...) that apply in an innovation process through strong interactions with industrial stakeholders from the aeronautical, automotive, wind turbine and cooling/ventilation sectors.

In that context, **Ecole Polytechnique Fédérale de Lausanne (EPFL)** is offering an Early Stage Research (ESR) position for a PhD project entitled

Non-local passive and active MDOF liners

Acoustic liners are a widespread solution for noise mitigation at aircraft engine level, due to lightweight and relatively small dimensions for integration within nacelles. Although conventional liners might be designed so as to target multiple tonal frequencies, their passive principle prevents the adaptation to varying engine speeds and therefore lowers their performance during flight, especially in the take-off and landing phases.

This research project aims at developing a novel class of acoustic liners, based on an architected distribution of electromechanical resonators. Each electromechanical resonator will be individually designed so as to exhibit multiple-degree-of-freedom resonator (MDOF) characteristics, taking advantage of the coupling between the mechanical and electrical components. Furthermore, the spatial arrangement of resonators will achieve enhanced performance towards the low-frequency range, where the typical wavelength is some orders of magnitude above the liner dimensions. This low-frequency behaviour will be achieved both with an optimal geometry (**passive**) and with distributed **active** control schemes.

The work will mainly consist in:

- developing a simulation framework for the design and optimization of passive and active MDOF resonators interacting with their acoustic environment,
- designing specific electromechanical transducers for the control,
- building a prototype for full-scale tests.

The PhD will be mainly based at EPFL under the supervision of Dr. Hervé Lissek, and several secondments are foreseen at partner institutions of the *SmartAnswer* network: at Ecole Centrale Lyon (France), Université du Maine (France), Siemens Industry SoftWare (Belgium) and Airbus Operations GmbH (Germany).

Please note that, to become a PhD candidate at EPFL and thus to be eligible for this position, you must first apply to, and be admitted, into one of EPFL's doctoral programmes.

The deadline for application are given on the EPFL PhD program webpage¹ (ideally to the Electrical Engineering doctoral program EDEE²).

The multidisciplinary topics addressed in SmartAnswer are scientifically challenging and of high technological and economical relevance, promising interesting career perspectives in academic and multi-sectorial industrial environments. The SmartAnswer partners do strictly adhere to the ethical standards of the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers³. Female scientists are particularly encouraged to apply. Applicants must satisfy some eligibility rules, in particular in terms of transnational mobility.⁴ A strict equal opportunity, gender-neutral and internationally comparable recruitment procedure is implemented.

Applications are to be made through the EURAXESS web site:

<https://euraxess.ec.europa.eu/jobs/173517>.

The EURAXESS offer ID corresponding to this position is: **173517**.

¹ <http://phd.epfl.ch/application>

² <http://phd.epfl.ch/EDEE>

³ <https://euraxess.ec.europa.eu/jobs/charter>

⁴ <http://ec.europa.eu/research/mariecurieactions>