

FICHE NAVETTE: DOCTORANTS IDEX

SECTOR : Higher Education Institution

LOCATION: France, Grenoble

RESEARCH FIELD (cf mots clefs sur Euraxess Jobs): Air pollution, health impacts,

RESEARCHER PROFILE:

□ *First stage researcher,*

INSTITUTION: Univ. Grenoble Alpes, University of Innovation

One of the major research-intensive French universities, Univ. Grenoble Alpes**1 enjoys an international reputation in many scientific fields, as confirmed by international rankings. It benefits from the implementation of major European instruments (ESRF, ILL, EMBL, IRAM, EMFL*2). The vibrant ecosystem, grounded on a close interaction between research, education and companies, has earned Grenoble to be ranked as the 5th most innovative city in the world. Surrounded by mountains, the campus benefits from a natural environment and a high quality of life and work environment. With 7000 foreign students and the annual visit of more than 8000 researchers from all over the world, Univ. Grenoble Alpes is an internationally engaged university.

A personalized Welcome Center for international students, PhDs and researchers facilitates your arrival and installation.

In 2016, Univ. Grenoble Alpes was labeled «Initiative of Excellence ». This label aims at the emergence of around ten French world class research universities. By joining Univ. Grenoble Alpes, you have the opportunity to conduct world-class research, and to contribute to the social and economic challenges of the 21st century ("sustainable planet and society", "health, well-being and technology", "understanding and supporting innovation: culture, technology, organizations" "Digital technology").

* ESRF (European Synchrotron Radiation Facility), ILL (Institut Laue-Langevin), IRAM (International Institute for Radio Astronomy), EMBL (European Molecular Biology Laboratory), EMFL (European Magnetic Field Laboratory)

Key figures:

- + 50,000 students including 7,000 international students
- 3,700 PhD students, 45% international
- 5,500 faculty members
- 180 different nationalities
- 1st city in France where it feels good to study and 5th city where it feels good to work
- ISSO: International Students & Scholars Office affiliated to EURAXESS

¹ Univ. Grenoble Alpes

MANDATORY REFERENCES:

CDP TITLE: MOBILAIR

SUBJECT TITLE: Evaluation of the oxidative potential to be a relevant health metric.

SCIENTIFIC DEPARTMENT (LABORATORY'S NAME): IGE-IAB

DOCTORAL SCHOOL'S: TUE

SUPERVISOR'S NAME: *Uzu Gaëlle, Rémy Slama*

SUBJECT DESCRIPTION:

We proposed a PhD study in an interdisciplinary context of diverse projects of 2 teams of scientists gathering atmospheric geochemistry (Chianti, IGE, Grenoble) and environmental epidemiology (Slama team, IAB, Grenoble). Such study will be part of the recently funded Mobil'Air project which aims to identify precise measures to reduce significantly atmospheric pollution in cities and its impacts. Mobil'Air has the following key aims:

- 1) To better characterize a population's exposure to pollution.
- 2) To improve our understanding of the factors determining mobility behavior.
- 3) To assist public-sector decision-making.

Mobil'Air will develop an integrated approach in the urban area of Grenoble, which is a relevant pilot area. Mobil'Air will seek to develop methods and instruments which can be copied in other cities in France and in other countries. Working in partnership with local government, the Mobil'Air project will combine modelling, environmental measurements, recurrent surveys of local residents, cohorts with their biobanks, study of impacts on public health, direct intervention on several hundred house-holds, by a team of researchers.

In this general framework, the specific work of the PhD will be included in the previous first aim of the assessment of the population's exposure to air pollution. All the work will be conducted at the interface of both teams.

State of the art and context of the PhD program.

Epidemiological studies suggest that the larger part of chronic effects of air pollution is likely to stem from PM, although separating the effects of PM from correlated pollutants is challenging. One key parameter that drives the toxicity of PM is their carrying or inducing reactive oxygen species (ROS), which are able to disrupt its redox balance. Both acellular and cellular methods were developed to quantify the PM capacity for in vivo generation of ROS: this new toxicologic metric is defined as the OP of aerosols. OP integrates particles size and surface properties together with chemical composition of PM, yielding a unique metric likely to be more representative of their potential interactions with specific targets in the human body. PM OP is a promising marker to understand their health impact and may be a better predictor of PM toxicity than PM mass concentration or even partial chemical composition. Several assays are currently developed to assess the OP of PM. No consensus has emerged towards a standard test. Among these tests, acellular assays have the advantage of being fast, cheap, and non-invasive compared to cellular tests, and are therefore promising in terms of their use in the large scale of epidemiological studies. This is a challenging and promising area of the research linking air quality, environmental chemistry, and health.

Scientifics goals:

- 1) To link oxidative potential and chemical composition of PM in the city of Grenoble.

A detailed chemical characterization of PM and markers indicative of the sources considered by policy measures, will need to be confronted with the oxidative potential of these PM, using several complementary assays (DTT, AA...). Measurements will include (i) long term measurements at two sites in areas impacted by the plans aiming at improving air quality and one site outside such areas; (ii) a multi-sites study to map PM concentrations and OP from indoor environments from SEPAGES cohort, to be compared to outdoor measurements; The PhD will evaluate the environmental effectiveness of the emissions' reduction plans (using traffic emission and residential biomass burning markers) and to evaluate variations in OP across the city, outdoors and indoor.

2) The second objective is to test OP relevance for human health using a cohort with personal PM sampling.

In the context of SEPAGES mother-child cohort (484 families), pregnant women have carried for eight days on two occasions in early and late pregnancy a personal PM sampler; air samplers are also being used in children around six weeks and filters are stored. The personal oxidative potential will need to be evaluated on these filters. The central work will be to evaluate the association between OP and the health of the children assessed at birth and up to three years of age adjusting for the relevant confounder. Health outcomes include children's respiratory and neurodevelopmental health. In addition, associations with epigenetic marks (genome-wide DNA methylation and transcriptomic, already funded) will be characterized, using appropriate data reduction and variable selection models.

ELIGIBILITY CRITERIA

Applicants:

- must hold a Master's degree (or be about to earn one) or have a university degree equivalent to a European Master's (5-year duration),

Applicants will have to send an application letter in English and attach:

- Their last diploma
- Their CV
- A short presentation of their scientific project (2 to 3 pages max)
- Letters of recommendation are welcome.

Address to send their application: jean-luc.jaffrezo@univ-grenoble-alpes.fr, gaelle.uzu@univ-grenoble-alpes.fr and remy.slama@univ-grenoble-alpes.fr

SELECTION PROCESS

Application deadline: **15/09/2018** at 17:00 (CET)

Applications will be evaluated through a three-step process:

1. Eligibility check of applications in 30/09/ 2018
2. 1st round of selection: the applications will be evaluated by a Review Board in 10/10/2018. Results will be given in 15/10/2018.
3. 2nd round of selection: shortlisted candidates will be invited for an interview session in Grenoble on 30/10/2018. (if necessary)

TYPE of CONTRACT: temporary-3 years of doctoral contract

JOB STATUS: Full time

HOURS PER WEEK: 35

OFFER STARTING DATE: June 2018

APPLICATION DEADLINE: 15/09/2018

Salary: between 1768.55 € and 2100 € brut per month (depending on complementary activity or not)

Financements de la thèse : si co-financements, préciser la durée de chacun des financements et l'organisme ou l'institution partenaire