# Post-doctoral position in numerical chemistry-transport modelling and air quality

**Employer:** Ecole Polytechnique (Palaiseau, France)
**Workplace:** Laboratoire de Météorologie Dynamique (École Polytechnique, Palaiseau, France, https://www.lmd.polytechnique.fr/intro/ )
**Contract duration:** 18 months
**Début de contrat:** May-June 2023
**Contacts:**
Romain Pennel (romain.pennel@lmd.ipsl.fr)
Sylvain Mailler (sylvain.mailler@lmd.ipsl.fr)
Laurent Menut (laurent.menut@lmd.ipsl.fr)

## Job description:

The work will be withing poject ESCAL'AIR (https://www.lmd.polytechnique.fr/intro/escalair.php), aimed at studying the effect of different spatial scales (global, continental, national, local) on air quality.

A key step to reach this target is realizing an **open-source** chemistry-transport modelling platform **combining the** DYNAMICO dynamical core (https://gitlab.in2p3.fr/ipsl/projets/dynamico/dynamico) and the CHIMERE chemistry-transport model (https://www.lmd.polytechnique.fr/chimere/). This novel platform platform with unstructured-grid ability will be adapted to **massively parallel calculation in High-performance computing environments**. The successful applicant will thus work on the French national supercomputers (GENCI). Developing this tool will be done with the Git versioning system, including CI tools. The successful applicant will collaborate in producing the documentation relative to this new platform, and to the formation of users depending on the needs.

When realised, this novel platform will open scientific prospects which could be valorized by the successful applicant towards the end of the project. Lack of knowledge in geosciences is not a barrier: the scientific work after the technical finalization of the platform will be performed in collaboration with the scientific groups collaborating to the project, and the realisation of an unstructured-mesh air quality model is in itself a breakthrough which is identified at the international level as a major target (https://www.epa.gov/cmaq/next-generation-air-quality-model). The ability of such a model to resolve an entire hemisphere with a coarse resolution, with zooms on critical regions (France, Europe, heavily-industralized parts of Asia) will permit to tackle in a novel way the problem of scale interactions in air quality, for example regarding ozone pollution, a non-linear and complex problem.

## Profile:

- Knowledge and experience in programming (Fortran, Python...)
- HPC computation, MPI
- Software design
- Source code management (svn, git) et quality-control (gitlab-ci)
- Experience in UNIX

**Additional competence:**
- Experience in scientific computing in Environmental sciences
- Knowledge in regional modelling