



## PhD opportunity on weather radar @ Ecole des Ponts ParisTech in the framework of the international Ra2DW ANR PRCI project

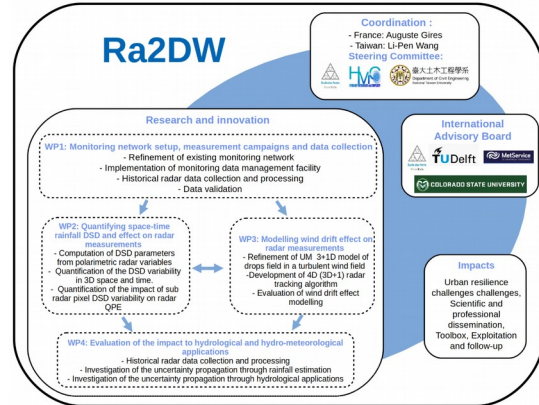


If interested by this PhD opportunity : please contact the supervisor [auguste.gires@enpc.fr](mailto:auguste.gires@enpc.fr) with CV and cover letter

### Overview of the Ra2DW project :

Ra2DW (Radar Rainfall Drop size distribution and Wind) is an international project between the department of civil engineering of Taiwan National University (NTU) and the HM&Co laboratory of Ecole des Ponts ParisTech (ENPC). It relies on the expertise of both teams in measurement and modelling across wide ranges of spatio-temporal scales of rainfall and atmospheric turbulence to improve the quality of weather radar quantitative precipitation estimates at high space-time resolution and their applicability to urban storm water management by addressing two issues: (i) Accounting for drop size distribution variability across scales, and notably the one occurring below radar observation scales; (ii) Better understanding and quantifying the wind drift effect, i.e. the advection of raindrops are advected during their fall from radar observation elevations to the ground

Ra2DW will open new paths to improve space-time rainfall estimates and nowcasts, a major challenge in a framework of increasing challenges of storm water management in urban areas associated with stronger rainfall extremes and growing urban population.



More details are available on the project's website <https://hmco.enpc.fr/portfolio-archive/ra2dw/>

### PhD topic: quantifying space-time variability of rainfall DSD and effects on radar measurements

It will basically rely on **multifractal analysis of the data collected in both pilot sites in Paris and Taipei areas**. In Paris, HM&Co operates a dual polarization X-band radar, a network of disdrometers as well as micro rain radar (to assess vertical variability of DSD). Radar and disdrometer data are also available in Taipei.

More precisely, the following steps will be implemented:

- **Computation of DSD parameters from polarimetric radar variables**. Based on literature review of existing methods. Implementation of selected methods on Paris and Taipei available radar data to generate time series of DSD maps.

- **Quantification of the DSD variability in 3D space and time**. Implementation of multifractal techniques to quantify variability in 3D space plus time of DSD features. Comparison between Paris and Taipei data will be carried out to assess potential influence of the geographical context on results.

- **Quantification of the impact of sub radar pixel DSD variability on radar rainfall estimation**. Use of a 3D+1 drops field model to mimic radar measurement at drop scale and assess the effect of DSD variability within a radar gate.

### Miscellaneous

The 3 years PhD will take place at Hydrology, Meteorology and Complexity laboratory of Ecole des Ponts ParisTech ([hmco.enpc.fr/](http://hmco.enpc.fr/)).

The PhD student will be involved in the Ra2DW project and benefit from stays in NTU, conferences participation, and exchanges with the International Advisory Board.

Background in environmental sciences, physics, statistics or related topics; and good programming skills would be appreciated.