Post-doctoral Research Fellowship at Météo France

BIRD MIGRATION DETECTION AND TRACKING BASED ON POLARIMETRIC WEATHER RADAR

Application deadline: 15 December 2021

Location: Météo France Weather Radar Centre. The radar center is located at the météopole, about 6 km from Toulouse town centre (about 20 minutes by bike and 30 minutes by metro).

Duration/Start: An initial contract of 6 months will be offered depending on the starting date. The contract is renewable annually, one calendar year at a time, up to 4 times. Starting date is as soon as possible ideally 1st February 2022.

Salary: between 2.6 and 3.2 k€ net monthly depending on candidate experience.

Work description

Météo France (the French National Weather Service) is seeking a post-doctoral researcher to work 24 months on the detection and tracking of migrating birds based on polarimetric weather radars.

Weather radars provide high temporal and spatial resolution coverage of the lower part of the troposphere. Although mostly used for the detection of precipitation, they are capable to detect also biological scatterers such as insects, bats and birds. Consequently, they are becoming an important tool to better understand the broad scale behaviour of biological scatterers such as migration patterns.

A better knowledge and monitoring of these migration patterns benefits society in many areas such as the control of pests and epidemics, flight safety and the support of environment conservation efforts. One particular area of interest is the energy industry. In order to mitigate the effects of climate change, the dependency on fossil fuels for energy production has to be reduced to the minimum. Consequently renewable energy sources such as solar and wind energy have to be scaled up significantly in the coming years. However, it is well known that wind farms can impact bird and bat populations, mostly due to collisions. The threat to wildlife posed by wind farms can be largely reduced by timely shutting down the wind turbines. A good forecast of bird migrations can inform the operation of the wind turbines and reduce costly downtimes.

In recent years there have been an international effort towards the advancement of the field of aero-ecology and tools for bird detection and tracking are running on a semi-operational basis in North America and Europe (e.g. http://www.enram.eu/).

In this context, Météo-France, together with France Energies Marines and Biotope, is participating in the research project SEMAFOR (Ob**S**ervation et pr**E**diction de la **M**igration de l'**A**vi**F**aune depuis les radars mété**OR**ologiques). The main objectives of the project are two-fold:

•The development and the implementation of a software to detect and track bird migrations using the Météo-France weather radar network
•The development of a probabilistic bird-migration prediction model

Météo-France together with Biotope will be responsible for delivering the first part of the project and the main objective of the work will be:

•Engage and contribute to the efforts of the international aero-ecology community in the field of bird detection and tracking
•Implement, evaluate and eventually improve current weather radar bird-detection algorithms.
•Implement and evaluate techniques to extrapolate the detection to areas where there is no radar data by using e.g. numerical weather prediction model data

The selected post-doc student will join an enthusiastic team of about 15 people including several other talented post-docs working full time on radar R&D.

Required qualification

Applicants should have a Ph.D. in physics, mathematics, remote Sensing, meteorology or similar. Knowledge of polarimetric radars and related algorithms is considered important. Applicants should be fluent in oral and written English. Knowledge of French would be an advantage. A good knowledge of UNIX / LINUX and of programming languages (C, C++) is required. Experience with PYTHON, R or similar is highly recommended. The work will be supervised by Dr. Jordi Figueras (Météo France, Toulouse, France). This job is offered with no restriction on age, sex or nationality, in accordance with French law.

Applicants should send:

•a letter of interest,
•a curriculum vitae (resume + list of publications),
•date of availability,
•names, fax numbers, e-mail and post addresses of two references to:

Dr. Jordi Figueras
Centre de Météorologie Radar
Direction des Systèmes d'Observation
Météo France
42, Avenue Coriolis 31057 Toulouse cedex (FRANCE)
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References

Shamoun-Baranes J, Bauer S, Chapman JW, Desmet P, Dokter AM, Farnsworth A, Haest B, Koistinen J, Kranstauber B, Liechti F, Mason THE, Nilsson C, Nussbaumer R, Schmid B, Weisshaupt N, Leijnse H. (2021) Weather radars' role in biodiversity monitoring. *Science* 372 (6539), 248, DOI 10.1126/science.abi4680

Dokter AM, Liechti F, Stark H, Delobbe L, Tabary P, Holleman I. (2011) Bird migration flight altitudes studied by a network of operational weather radars. *Journal of the Royal Society Interface* 8, 30–43