

Luxembourg Institute of Science and Technology

Project title: *Understanding the effects of vegetation functional traits on ecosystem transpiration by integrating surface energy balance and canopy radiative transfer modeling in eco-hydrologically contrasting ecosystems.*

The Luxembourg Institute of Science and Technology (LIST) is offering a fully paid PhD student position in the framework of a newly funded Doctoral Training Unit (DTU) in Water Sciences: Hydro-CSI.

The doctoral programme HYDRO-CSI is funded in the frame of the PRIDE scheme of the Luxembourg National Research Fund (FNR)

The main objective of the DTU is to train a new generation of highly skilled experts with a view to contribute to solving some of the most pressing challenges related to water resources research and management: hydrological system complexity, non-stationarity of boundary conditions, high-frequency monitoring of environmental processes, ecohydrological aspects of land-atmosphere interactions, global change impact assessment. This 4-year position will commence in April 2017.

The PhD student will be part of Water Safety and Security Unit at the Department of Environmental Research and Innovation (ERIN) and will work in the Remote Sensing and Ecohydrological Modeling research group. Furthermore, the PhD candidate will be affiliated with the University of Wageningen.

Job description:

Proposed research: There is currently still poor understanding of how vegetation functional traits affect transpirational water loss in natural ecosystems. The overall research question of the PhD project is to understand how important functional traits (vegetation structure, biochemistry) affect water vapour loss from vegetation (interception, transpiration). Quantification of vegetation transpiration will be achieved by integrating canopy radiative transfer (CRT) and surface energy balance (SEB) modelling. As a critical model input thermal and optical satellite data (Sentinel-2, Landsat-8 and Sentinel 3, MODIS) will be used in conjunction with meteorological, micrometeorological and vegetation biophysical variables.

Model development involves, (1) combining CRT model with SEB model (based on Penman-Monteith and Shuttleworth-Wallace) for ET partitioning into a novel scheme, (2) testing and validating the proposed scheme using both tower as well as satellite-based land surface temperature, radiative and meteorological forcings at multiple spatial scales using satellite data, (3) a systematic intercomparison of the novel scheme with existing ET partitioning models, and (4) develop uncertainty framework in evapotranspiration estimates.

Summarise what activities and responsibilities the position will involve

The PhD candidate is expected to take part in the PhD training at LIST and the University of ... and spent XY time at the affiliated University.

Eligibility:

- No restrictions apply as to the nationality of the candidates
- Candidates may not have received a doctorate prior to their application to this position
- Candidates shall be available for starting their position no later than 1st April 2017

Qualifications:

- Be a last year master's student (or master's degree completed) in Environmental Science, or Environmental Engineering, Hydrology, Remote sensing, Agrometeorology, Geography or related disciplines.
- Have excellent understanding, scientific philosophy, and interests in environmental / SEB modelling / CRT modeling and optical and thermal remote sensing.
- Excellent English skills in speaking, listening, reading and writing
- Highly motivated to be part of an international DTU and to perform high quality research
- Good programming ability in MATLAB, skilful in GIS. Knowledge of Python and R will be a plus.

Place of employment and main place of work:

- Name and position of primary supervisor: **Kaniska Mallick and Martin Schlerf** (Senior R&D Associate), LIST
- Place of research: Luxembourg Institute of Science and Technology
- That the candidate will be co-supervised by name, position and institution
Miriam Machwitz (Junior supervisor from LIST)
M. Herold
R. Teuling
R. Uijlenhoet
- Duration and location of secondment/s: Wageningen University

Application procedure:

The application can be submitted via LIST's job portal: XY. If there are any questions regarding the procedure please contact our HR office (jobs.list.lu). The application must include:

- A motivation letter oriented towards the preferred position and experience
- A current CV, which includes full contact details
- Two reference letters or full contact details of the two referees
- A copy of master (or similar) degree (or provisional Master's degree certificate) that allows for the enrolment on a doctorate degree

Applications will be reviewed on-going until all positions are filled, with the final date of submission being XY. An assessment committee will be appointed to review the applications and candidates selected based on Network-wide guidelines, which aim to ensure equal opportunities. Shortlisted candidates will be invited to interview either in person or by Skype. Candidates must be available to start by no later than 1st January 2017.

The main criterion for selection will be the existing skills, knowledge and research career potential of the applicant, match with the project, and fulfilment of the above mentioned qualifications. Candidates from all backgrounds are encouraged to apply.

Equal opportunities policy at LIST...

All open positions are published and recruitment is performed according to international best practices. All PhD candidates are joining LIST under an employment contract for the full duration of their PhD project.

The HYDRO-CSI DTU subscribes to the principles of research integrity within the framework of the FNR funding scheme (FNR Research Integrity Guidelines). These rules rely on the European Code of Conduct for Research Integrity, the Singapore Statement on Research Integrity and the Montreal Statement on Research Integrity.

PhD candidate mobility will consist in secondments to partner universities, as well as private companies in case of potential for collaboration on applied aspects, technological developments or business opportunities (e.g. in the framework of a Private Public Partnership).