## Postdoctoral (Research Fellow) position in Hydrological Modelling

**Invitation to apply**. The Department of Civil and Environmental Engineering at the National University of Singapore (NUS) invites applications for one Research Fellow (Postdoc) position in Hydrological Modelling to begin as soon as possible.

**The project** "Network of Experimental Catchments for Understanding Runoff Formation and Flood Risk" aims at establishing a network of experimental catchments to study runoff formation in Singapore. In particular, by combining observed data and advanced modelling tools the project aims to use data collected in experimental catchments to (i) advance our understanding of runoff generation processes; (ii) to employ and develop physics-based hydrological models and physics-informed deep learning models; (iii) to evaluate the effectiveness of current drainage infrastructure in the context of a changing climate and increasing urbanization through scenario analyses. Results will be of paramount importance to improve the accuracy of rainfall-runoff simulations and flood risk assessments.

**Qualifications**. We are looking for a candidate with a PhD degree in Environmental Engineering, Environmental Science or related disciplines which includes specific and broad knowledge in the areas of hydrology, urban hydrology, floods, or ecohydrology. Candidates with an interdisciplinary background are welcome, but strong data analytics skills and knowledge of process-based numerical modelling tools and/or machine learning approaches is required. Very solid modelling skills, including programming skills (e.g., Matlab, Julia, Python) are a fundamental pre-requisite for the position. Experience in using process-based hydrological models is an asset for this position. Experience with high-performance computing would be preferable. Previous experiences in international contexts are also positively evaluated. The candidate is expected to be a highly organized and proactive person and able to work both in team and independently. Demonstration of innovative scientific results obtained during the PhD and communication skills are important elements of evaluation. A proficient command of oral/written English is essential.

**Responsibilities.** The candidate will be responsible for completing the scientific tasks of the project, leading and contributing to publications, and is expected to work on the integration of the different tasks with the other postdoctoral fellows working on the project. Besides contributing to the research activities of the project, the successful applicant is expected to support in a broader sense the research of the Hydrology group at NUS, thereby providing occasional support to graduate students (MSc and PhD).

The **National University of Singapore** is among the top universities in the world. The Department of Civil and Environmental Engineering is also very highly ranked internationally. Further information on the Department is available at: https://www.eng.nus.edu.sg/cee/.

**Terms of appointment**. The successful candidate will be offered a Research Fellow (Postdoc) position for 24 months with possibility of extension based on performance and fund availability. The contract conditions follow the National University of Singapore regulations. Working conditions are excellent and Singapore is an attractive city rated very high in terms of life quality and living standards. Salary is very competitive when compared to similar positions abroad.

**Application procedure**. Applications should include in a single .pdf file: (i) a motivation letter, (ii) a detailed Curriculum Vitae including a list of publications, and (iii) contacts of 2 to 3 reference persons. Applications should be submitted at the following link: https://www.dropbox.com/request/mLYUePUjNKnWgWOBa0xt . Shortlisted applications will be asked to participate to an interview that will take place over video.

Additional information about the position may be obtained by writing to Prof. Simone Fatichi (ceesimo@nus.edu.sg). Screening for the position will start on April 30th and the positions will remain open until filled. The expected appointment date is the earliest possible following the committee decision and administrative processing.

## Postdoctoral (Research Fellow) position–Machine Learning for Hydro-Meteorological Domain

**Invitation to apply**. The Department of Civil and Environmental Engineering at the National University of Singapore (NUS) invites applications for one Research Fellow (Postdoc) position in **Machine Learning for Hydro-Meteorological Domain** to begin as soon as possible.

Project titled **"Enhancements of Singapore's Convective Rainfall Prediction**" aims to address several key challenges: (i) How can physics-informed machine learning refine the hydrologically-based model for hyperlocal representation of convective rainfall; (ii) How can we enhance convective rainfall prediction with sensing technologies and (iii) How can machine learning develop surrogate models to accelerate process-based simulations. The project is conducted under a multi-institutional and inter-disciplinary Centre of Excellence called *Coastal Protection and Flood Resilience Institute (CFI) Singapore.*

**Qualifications**. We are looking for a candidate with a PhD degree in Hydro-Meteorology, Water Resources Management, Atmospheric Science, Statistics, Machine Learning, Computer Science, or a related field, which includes broad knowledge in hydrology, urban hydrology and flooding. Candidates with an interdisciplinary background are welcome to apply. Proficiency in **Python**, experience in deep learning frameworks such as **TensorFlow** and **PyTorch**, and excellent programming skills (e.g., Python, Julia,) are fundamental prerequisites for the position. Experience with high-performance computing would be preferable. Previous experiences in international contexts are also positively evaluated. Demonstration of innovative scientific results obtained during the PhD and communication skills are essential elements of evaluation. A proficient command of oral/written English is necessary.

**Responsibilities.** The candidate will be responsible for completing the scientific tasks of the project, leading and contributing to publications, and is expected to work on integrating the different functions with the other postdoctoral fellows working on the project. The research focus is on **rainfall estimation algorithms and nowcasting models**. The primary requirement is expertise in **developing rainfall estimation models using X-band, C-band and S-band weather radar and commercial microwave link data**, as well as **rainfall nowcasting models**. These skills are as important as general data science and machine learning expertise. The successful candidate is expected to design and implement state-of-the-art rainfall estimation and nowcasting methodologies, leveraging both physics-based and machine learning approaches. The candidate is expected to be a highly organised and proactive person, who will be able to work independently as well as with other researchers to ensure accuracy and effectiveness.

In addition to contributing to the research activities of the project, the successful applicant is expected to support in a broader sense the research of the Water Resources group at NUS, thereby providing occasional support to graduate students (MSc and PhD).

The **National University of Singapore** is among the top universities in the world. According to the latest QS subject ranking, the Department of Civil and Environmental Engineering is ranked 3rd globally. Further information on the Department is available at: https://www.eng.nus.edu.sg/cee/.

**Terms of appointment**. The successful candidate will be offered a Research Fellow (Postdoc) position for 24 months with possibility of extension based on performance and fund availability. The contract conditions follow the National University of Singapore regulations. Working conditions are excellent and Singapore is an attractive city rated very high in terms of life quality and living standards. Salary is very competitive when compared to similar positions abroad.

**Application procedure**. Applications should include in a single .pdf file: (i) a motivation letter, (ii) a detailed Curriculum Vitae including a list of publications, and (iii) contacts of 2 to 3 reference persons. Applications should be submitted at the following link: https://www.dropbox.com/request/pQUKmTFfdunF7QuKzsxs . Shortlisted applications will be asked to participate to an interview that will take place over video.

Additional information about the position may be obtained from Prof. Vladan Babovic (vladan@nus.edu.sg). Screening for the position will start on April 30th. The positions will remain open until filled. The expected appointment date is the earliest possible following the committee decision and administrative processing.