Internship Opportunity UM6P Benguerir – IMFT Toulouse:
Adaptable Hydro-Informatics based models for Rainwater Harvesting

We are excited to announce a graduate level internship opportunity in the field of Rainwater Harvesting as part of our ongoing project on climate change adaptation in Morocco. This project is a collaborative effort between the Massachusetts Institute of Technology (MIT) and University Mohammed VI Polytechnique (UM6P) on the one hand, and between the Institut de Mécanique des Fluides de Toulouse (IMFT) and the University Mohammed VI Polytechnique (UM6P) on the other hand.

Project Overview:

Rainwater Harvesting stands as a crucial alternative solution to bolster water security, particularly in semi-arid and arid regions. Rural areas, distant from seas or oceans, are especially vulnerable to water scarcity, which may worsen with the impact of climate change. Recent studies have shown a shift in precipitation patterns towards more intense and extreme rainfall events. Therefore, the implementation of water collection systems becomes an urgent necessity. However, this process demands a comprehensive understanding of the hydrological environment, which is often lacking in many underprivileged rural areas around the world.

In light of this challenge, the MIT-UM6P project focuses on harnessing open source gridded data to offer initial insights into space-time rainfall fields and into the state of water bodies, that can eventually serve as inputs into hydrological flow models for regions with limited access to gauge station data.

The primary goal of this internship is to develop algorithms that can effectively utilize remote sensing and hydro-meteorological data to inform the optimal placement and design of systems for harvesting rainwater and/or collecting runoff water. The algorithms to be developed in this internship will involve assessing topographic data, delineating small to medium-sized watersheds, and evaluating rapid hydrodynamics within these areas under specific heavy precipitation scenarios.

Internship Details:

- ▪ *Data Resources*: The UM6P experimental farm has already implemented its own rainwater harvesting system, and the data collected from this site can be used for model calibration in a real-world setting.

- ▪ *Computing Environment and Languages*. The UM6P will provide the computing environment through its HPC facilities and access to the various hydrological datasets previously developed; the IMFT will provide support on algorithms previously developed in Fortran, Matlab, and/or Python.

- **Supervision:** The intern will be mentored by two professors: Pr. Rachid ABABOU from IMFT (Toulouse, France) and Pr. Nabil EL MOÇAYD from UM6P (Benguerir, Morocco). Regular meetings with collaborators from MIT (Cambridge, Massachusetts, USA) will also be scheduled to ensure a collaborative work environment.

Qualifications:

We are looking for highly motivated individuals, e.g. graduate students towards a Master degree or a final engineering degree, with a background or strong interest in hydrology, environmental flow modeling, remote sensing, or related fields. Proficiency in computer programming and data analysis is a plus, but not a strict requirement. Excellent communication skills and the ability to work in a multidisciplinary team are highly valued.

How to Apply:

If you are passionate about addressing critical water security challenges in arid and semi-arid regions and are interested in contributing to our ongoing project, please send your resume (CV) and a brief statement of interest before December 31st, 2023, to:

➢ Pr. Nabil EL MOÇAYD :   nabil.elmocayd@um6p.ma

with Carbon Copy to :

➢ Pr. Rachid ABABOU: rachidababou@gmail.com

We are looking forward to welcoming a dedicated intern who will play a crucial role in developing innovative solutions for water management and rain harvesting in Morocco. Feel free to contact us if you have any questions or require further information.

N.B: *Depending on results, this internship may be continued as a fully funded doctoral thesis (PhD) within the same project framework.*