



Two-year postdoctoral position in ERC-Synergy project: Laminar and turbulent flow and transport modeling in karst conduits

Institute of Environmental Assessment and Water Research (IDAEA-CSIC),
Spanish National Research Council (CSIC)
Barcelona, Spain

Job Description

You are a scientist with interest and or experience in **computational fluid mechanics** and are looking for an exciting project in which you will tackle **earth science issues with a high scientific and societal impact**. You are motivated by understanding water flow and solute transport in caves and conduits characterized by complex geometries. You are capable of analyzing data and constructing models to represent the key features of conduit scale processes.

We are a multidisciplinary research team (<https://erc-karst.eu/>) funded by the European Research Council (ERC: <https://erc.europa.eu>) involving physicists (B. Noetinger, M. Dentz), mathematicians (B. Mohar), computer scientists (S. Lefebvre) and hydrogeologists (P. Renard) from Spain, France, Canada, Slovenia and Switzerland. Our aim is to establish novel tools to model groundwater flow and solute transport in karst systems at multiple scales based on strong physical principles using a combination of field, laboratory, and numerical experiments.

In the team, **you will be in charge of characterizing and modeling conduit scale water flow and solute transport to achieve a new fundamental understanding of these processes**. The tasks include the integration of three-dimensional geometrical data of caves obtained from LIDAR measurements into numerical CFD models. Numerical models will be used to simulate water flow under laminar and turbulent conditions as well as pressurized and free surface flow. They will also be used to numerically solve for particle and solute transport. You will strongly interact with the flow and transport experiments that will be conducted at IFPEN in Paris and cave characterization at University of Neuchatel.

Qualifications and selection criteria

- Ph.D. degree in engineering, computational science, physics, applied mathematics, geophysics, earth science, or a related field.
- Experience in programming (Python/C++) and manipulating large data sets.
- Capacity to organize and carry out numerical CFD simulation in complex geometries.
- Excellent team work and organization skills.
- Excellent verbal and written communication skills in English.

Duties and Responsibilities

- Participate in regular project meetings with team members and collaboration partners.
- Set up a CFD model for the numerical simulation of flow and transport in complex conduit geometries.

- Analyze and compare numerical and experimental data.
- Collaborate with the teams in charge of laboratory experiments and conduct characterization.
- Disseminate of the research results in peer reviewed journals and conferences.
- Contribute to project reports.
- Identify areas for research, develop new research methods and extend the research portfolio.
- Continue to update personal knowledge and develop skills within the own specialist research area.

Additional information and benefits

- Place of work: based in Barcelona, Spain + travels for meetings and laboratory visits
- Gross salary: 40,000 Euro/year
- Contract: full-time during 2 years, possible extension for an additional year
- Starting date: as soon as possible
- CSIC is an equal opportunity employer. We are committed to fostering, cultivating and preserving a culture of diversity, equity and inclusion.

How to apply?

Complete applications should be sent as one single pdf document by email to Marco Dentz at marco.dentz@csic.es stating *Application position ERC Karst* in the email subject. The application must include: 1) motivation letter, 2) curriculum vitae, 3) complete course grades and transcript, 4) contact information of two reference persons, 5) link to or copies of your PhD thesis and/or relevant publications.

Deadline: open until filled

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