



Two-year postdoctoral position in ERC-Synergy project: Turbulent flow and transport 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 **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), hydrogeologists (P. Renard), mathematicians (B. Mohar), computer scientists (S. Lefebvre) 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 working on characterizing and quantifying conduit scale water flow and solute transport to achieve a new fundamental understanding of these processes**. The tasks include laboratory experiments of flow and solute transport in 3D-printed synthetic karst conduits obtained from real cave data, analysis of experimental and numerical data. The experimental methods involve laser imaging and PIV to assess local flow and transport properties. Based on these data and data from detailed CFD simulation, the aim is to identify the conduit scale flow and transport laws under complex geometries at different Reynolds numbers using statistical analogues and stochastic processes. You will strongly interact with the project partners at IFPEN in Paris for the laboratory experiments, and at University of Neuchatel for cave characterization.

Qualifications and selection criteria

- Ph.D. degree in engineering, computational science, physics, applied mathematics, geophysics, earth science, or a related field.
- Experience in fluid mechanics (experimental/numerical).
- Experience in programming (Python/C++).
- Experience in manipulating and analyzing large data sets.
- 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.
- Analyze and compare numerical and experimental data.

- Collaborate with the teams in charge of laboratory experiments and conduit 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: December 1, 2024
- 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 postdoc 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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