

Hydrogeology and rock mechanics

Expertise Fractured media, numerical modeling, Discrete Fracture Network approaches to site modeling and hydromechanical and contaminant transport processes.

Education PhD (Hydrogeology), Université Rennes, France, 2002
DEA (Hydrogeology, Hydrology, Geochemistry and Geostatistics), 1998
MS (Physics and Geophysics), 1997

Professional Experience

2018 – present *Fractory Joint Laboratory, Rennes University, France, Co-director*
2010 – present *Itasca Consultants S.A.S, France, Principal Engineer*
2002 – 2010 *Itasca Consultants S.A.S, France, Engineer/Scientist*
1999 – 2002 *Géosciences Rennes, Université Rennes, France, PhD Student*

Project Experience

R&D related to risk assessment investigation programs for long term deep storage of spent fuel; focus on geometrical, flow, mechanical, and hydromechanical processes and properties in geological fractured media.

Integration of Discrete Fracture Network modeling into numerical models for geomechanical and hydrogeological applications. Assessment of the role of discontinuities on rock mass mechanical and flow properties. Application to mining (Project Mass Mining Technology) and nuclear waste storage industry.

Derivation of equivalent effective flow (connectivity, hydraulic conductivity), mechanical and hydromechanical properties from fractured rocks.

Use of flow log testing at depth to evaluate the capacity of based DFN models to define the scaling properties of the rock mass equivalent permeability. Development of flow and transport channeling indicators.

Quantitative prediction of rock primary fragmentation distribution from numerical modeling of caving propagation.

DFN geometrical modeling, including multiscale aspects, spatial correlations, uncertainty and spatial variability. Applications at the Swedish Äspö Hard Rock Laboratory, Laxemar and Forsmark sites, as part of R&D investigation programs for deep geological storage of nuclear waste.

Numerical modeling of tracer tests for the True Block Scale Project at the Äspö site (Sweden).

Software development (C/C++). Implementation of variably saturated flow in a finite element code. Implementation of Particle Following method. Implementation of a free-surface algorithm for flow into pipe networks.

Modelling of the unsaturated flow in discrete fractures close to a drift (Yucca Mountain).
Unsaturated flow in fractured media. Equivalent Continuum Medium and Modified Invasion Percolation approaches