PINIER Benoît

Research Engineer

Expertise

Scientific Computing, Software Design and Implementation, Numerical Modeling of Fractured Media, Hydrogeology, Geomechanics, and Discrete Fracture Network (DFN) Modeling in Fractured Rocks.

Education

Ph. D. in applied mathematics (turbulence),
University of Rennes, France, 2019
Application of the similitude theory in turbulence, application to the ocean atmosphere interface

Master's degree, Scientific computing and their application, applied mathematics
Rennes University, France, 2014

Maîtrise, Optimization and Operational research,
Nantes University, 2012

Bachelor's degree, fundamental mathematics,
La Rochelle University, 2011

Professional Experience

2021 – Present	Itasca Consultants S.A.S, Rennes, France *Project engineer, software engineer*
2018-2021	Geosciences Rennes, CNRS, Rennes, France Research engineer
2014 - 2018	IRMAR, INRIA, Rennes, France PHD Candidate
2014	Royal Observatory of Belgium, Brussel, Belgium Computer scientist internship Development of numerical simulation to predict the past of the orbits of the Mars natural satellites Phobos and Deimos
2013	INRAE, Rennes, France Computer scientist internship Translation of computer vision code for turbulence purpose using CUDA.

Project Experience

Engineering

- Modelling of a discrete fracture network (DFN) of the fault zone
- Application of the DFN recipe to model the Forsmark nuclear repository

- Study of the effect of the mechanical and stress model on the mechanical properties of the geological medium
- Application of the DFN methodology for gas storage
- Research project of coupling the fluid software OpenFoam with BlastFoam library for blasting processes

Development of DFN.lab Software

Key contributor to the development of DFN.lab, an advanced software tool for simulating physical processes in fractured rocks, including flow, transport, and mechanical interactions.

Designed and implemented key modules that expanded DFN capabilities, enabling accurate simulations for complex geological structures.

Development of the numerical methods (mesh, finite element, particle tracking) in DFN

Development of 3D finite element software and particle tracking method to compute the hydraulic properties of the geological media with a DFN.

Development of a block stability scientific code from the geometrical problem to determine the blocs and application of limit equilibrium method to get the factor of safety.

Geothermy

Development of a state-of-the-art numerical model to compute the thermic transfer in a coupled matrix and the discrete fracture network

Training

Creation of a training course about the usage of the DFN.lab software and the DFN methodology