

# HAFSSA TOUNSI

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## EDUCATION

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**MINES ParisTech, France** *November 2015*

Ph.D in Geosciences and Geoengineering

*Relevant courses:* Continuum Mechanics, Mechanics of the porous media, Constitutive modeling of geomaterials, THMC coupling.

**Ecole des Ponts ParisTech, France** *September 2014*

MSc in the Mechanics of Soils, Rocks and Structures in their Environment

*Relevant courses:* Finite element method, Soil and Rock mechanics, Mechanics of unsaturated soils, the Convergence-Confinement Method of tunnel design.

**Ecole Hassania des Travaux Publics, Morocco** *September 2011*

Civil engineering degree

*Relevant courses:* Dam design, Road Alignment, Steel construction, design of concrete buildings, slope stability.

**Lycée Omar Ibn EL KHATTAB, Morocco** *September 2009*

Preparatory classes for the national entrance exam for admission to Science and Engineering schools

## WORK EXPERIENCE

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**SERD, civil engineering consulting** February 2014 - June 2014

*Engineering intern*

*Morocco*

- Steel building design
- A comparative study between two steel construction regulations CM66 and EUROCODE 3
- Energy efficiency study according to RT 2012
- Software: Robot Structural Analysis

**TEAM Maroc, civil engineering consulting** July 2013 - August 2013

*Engineering intern*

*Morocco*

- Design of structural elements of a concrete building
- Comparative study between isolated spread footings and a raft foundation
- Software: Robot Structural Analysis

**ECID, civil engineering consulting** July 2012 - August 2012

*Engineering intern*

*Morocco*

- Assistance and contribution in the planification and supervision of the work in the construction site of a residential complex.

## RESEARCH EXPERIENCE

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**Lawrence Berkeley National Laboratory**

**Energy Geosciences Division-Hydrogeology Department**

September 2020

*Postdoctoral Researcher - Advisor: Jonny Rutqvist*

*USA*

- DECOVALEX 2023: brine availability in bedded salt deposits under heated conditions associated with disposal of heat-generating waste in a salt repository.
- Numerical modeling of coupled processes relevant to radioactive waste disposal in geologic formations.
- Programming and Software: TOUGH, FLAC3D, COMSOL Multiphysics, Fortran, Python.

## Centre de Géosciences

### MINES ParisTech

Research Engineer - Advisor: Ahmed Rouabhi

November 2015 - November 2019

France

- In partnership with ORANO as part of the Cigar Lake mine freezing and exploitation operations
- The set up of a frozen soil mechanical testing equipment
- A testing campaign on rock samples from the Cigar Lake mine
- Thermo-hydro-mechanical and chemical model of ground freezing. Application to the Cigar Lake mine.
- Programming and Software: COMSOL multiphysics, Fortran, Scilab.

### Navier Laboratory, geotechnical team (CERMES),

#### Ecole des Ponts ParisTech

Research Engineer (Internship) - Advisor: Amade Pouya

March 2015 - September 2015

France

- In collaboration with BRGM (French Geological Survey)
- Numerical hydro-chemo-mechanical Model for Fault Activation under Reactive Fluid Injection. Application to CO<sub>2</sub> storage.
- Software: FEM-based program POROFIS, Fortran.

## TEACHING EXPERIENCE

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- Teaching assistant (2020) at Ecole des Ponts ParisTech: engineering geology course for civil engineering students
- Assistant Internship Mentor (2018) at MINES ParisTech: "Study of the stability of production tunnels under freezing effect and consequences on their support systems"

## RESEARCH PAPERS

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**Tounsi, H., Pouya, A. & Rohmer, J. (2020). Coupled hydro-chemo-mechanical model for fault activation under reactive fluid injection. *European Journal of Environmental and Civil Engineering*.**

**Tounsi, H., Rouabhi, E., Jahangir, M., & Guérin, F. (2020). Mechanical behavior of frozen Metapelite: Laboratory investigation and constitutive modeling. *Cold Regions Science and Technology*.**

**Tounsi, H., Rouabhi, A., Jahangir, E. (2020). Thermo-Hydro-Mechanical modeling of artificial ground freezing taking into account the salinity of the saturating fluid. *Computers and Geotechnics*.**

**Tounsi, H., Rouabhi, A., Tijani, M., & Guérin, F. (2019). Thermo-Hydro-Mechanical modeling of artificial ground freezing : Application in mining engineering. *Rock Mechanics and Rock Engineering*.**

**Rouabhi, A., Jahangir, E., & Tounsi, H. (2018). Modeling heat and mass transfer during ground freezing taking into account the salinity of the saturating fluid. *International Journal of Heat and Mass Transfer*, 120, 523-533.**

## PARTICIPATION IN CONFERENCES

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**Tounsi, H. & Rouabhi, A. Coupled Thermo-Hydro-Mechanical Modeling of Artificial Ground Freezing: Application to a Mine in a Complex Hydrogeological Context.** *Coufrac 2020, November 11-13, 2020, Seoul, Korea.*

**Tounsi, H., Rouabhi, A., Tijani, M., & Guérin, F. 3D Numerical modeling of artificial ground freezing in mining engineering.** *Proceedings of the WTC 2019 ITA-AITES World Tunnel Congress, May 3-9, 2019, Naples, Italy.*

Ahmad Pouya, **Tounsi Hafssa**, Jeremy Rohmer. **A Numerical Hydro-Chemo-Mechanical Model for Fault Activation under Reactive Fluid Injection.** *AGU Fall Meeting, Dec 2015, San Francisco, United States.*

## HONORS & AWARDS

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**Pierre Londe Prize** June 2020  
*French Society of Rocks Mechanics* France

- Best Rock Mechanics PhD Thesis for the year 2020 in France.

**Excellence Scholarship** September 2014-September 2015  
*Lafarge Chair on Materials Science for Sustainable Construction* France

- Excellence scholarship for international students to prepare an MSc degree at Ecole des Ponts ParisTech.

**Languages** Arabic (native), French (bilingual), English (full proficiency)

**Citizenship** citizen of Morocco

## References

### **Jonny Rutqvist**

Hydrogeology Department Head at  
Lawrence Berkeley National Laboratory  
jrutqvist@lbl.gov

### **Ahmed Rouabhi**

Research scientist at MINES ParisTech  
ahmed.rouabhi@mines-paristech.fr

### **Amade Pouya**

Professor at Ecole des Ponts ParisTech  
ahmad.pouya@enpc.fr

### **Frédéric Guérin**

Project director at ORANO  
frederic.guerin@orano.group