

Ali Zidane

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EDUCATION

- 2009 – 2012 **PhD in fluid mechanics (earth sciences), Basel University**
"Umweltgeologie, Geologisch-Paläontologisches Institut"
PhD topic: Modelling density driven flow in porous media and in free flow media; PhD supervisor: Prof.Dr. Peter Huggenberger
- 2008 – 2009 **Master's degree in Mechanics, Lebanese University, Beirut**
Ranked number 1 in class (Grade: Very good)
Recommended to do a PhD in Switzerland by the dean of the Faculty of Engineering in Lebanon Prof.Dr. Rafic Younes, Beirut, Lebanon
- 2003 – 2008 **Mechanical engineer studies, Lebanese University, Beirut**
Ranked number 2 in class (Grade: Very good)

PROFESSIONAL EXPERIENCE

- Since - 08/2013 **Postdoc at Reservoir engineering research institute, Palo Alto California, USA**
Numerical modelling of single and multiphase flow in fractured and unfractured porous media
- 01/2013 - 08/2013 **Research associate at Umweltgeologie, Geologisch-Paläontologisches Institut, Basel, Switzerland**
Numerical modelling of evaporite dissolution in porous media

PUBLICATIONS

JOURNAL ARTICLES

- Zidane A., A. Firoozabadi. An efficient numerical model for multicomponent compressible flow in fractured porous media. *Advances in water resources journal*, Volume 74, 2014, Pages 127–147; DOI:10.1016/j.advwatres.2014.08.010.
- Zidane A., E. Zechner, P. Huggenberger, A. Younes. On the effects of subsurface parameters on evaporite dissolution (Switzerland). *Journal of Contaminant Hydrology*, 160 (2014) 42–52
- Zidane A., E. Zechner, P. Huggenberger, A. Younes. Simulation of rock salt dissolution and its impact on land subsidence. *Hydrol. Earth Syst. Sci.*, 18, 2177–2189, 2014
- Younes A., Fahs M, Zidane A, Huggenberger P, Zechner E. A new benchmark with high accurate solution for hot-cold fluids mixing, *Heat and Mass Transfer*, DOI: 10.1007/s00231-015-1500-z
- Younes A., A. Markadi , A. Zidane, Q. Shao, L. Bouhala. A combination of Crouzeix-Raviart, Discontinuous Galerkin and MPFA methods for buoyancy-driven flows. *International Journal of Numerical Methods for Heat & Fluid Flow* Vol. 24 No. 3, 2014 pp. 735-759
- Zidane A., A. Younes, P. Huggenberger, E. Zechner. The Henry semi- analytical solution for saltwater intrusion with reduced dispersion, *WaterResour. Res*, doi: 10.1029/2011WR011157, 2012
- Younes A, Konz M, Fahs M, Zidane A, Huggenberger P. Modelling variable density flow problems in heterogeneous porous media using the method of lines and advanced spatial discretization methods. *Mathematics and Computers in Simulation* (2011),(81) 2346–2355

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PROCEEDINGS

- Younes A., Zidane, A., Oltean, C., Huggenberger, P. Modelling coupled Stokes flow and mass transport within fractures" Proceedings of 2013 International conference on Advances and Challenges in Porous Media (ACPM) (2013) Sousse, Tunisia 26-28 April 2013.
- Zidane A., A. Younes, P. Huggenberger, E. Zechner (2012). Analytical-numerical solution for density dependent flow in free flow media, Computational Methods in Water Resources 2012 (Conference in Urbana Champaign, IL, USA, 17-21 June 2012)
- Zechner E., A. Zidane , A. Younes, P. Huggenberger, (2011), Simulation of high contrast density-driven transport at field scale, Geophysical Research Abstracts, 13, EGU11-11892 (Vienna, Austria).
- Zechner E., Zidane A., Konz M., Younes A., Huggenberger P. Subsurface dissolution of evaporitic rocks, Proceedings 9th Conference on Limestone Hydrogeology (Besançon, France 2011).

BOOKS

Internal author in:

- Urban Geology: Huggenberger, Peter; Epting, Jannis (Eds.). Process-Oriented Concepts for Adaptive and Integrated Resource Management 2011, XVI, 216 p., Springer
- The Role of Tectonic Structures and Density-Driven Groundwater Flow for Salt Karst Formation; P. Huggenberger, A. Zidane, E. Zechner, D. Gechter Engineering Geology for Society and Territory-Volume 5, 609-612

IT SKILLS

Proficient in Fortran, Matlab, Tecplot, Carrier Hap, AutoCad

Broad experience with Numerical modelling

Excellent knowledge in MS Word, Excel, PowerPoint, Adobe illustrator, Adobe Photoshop

LANGUAGE SKILLS

Arabic mother tongue, fluent in English and French, basic German skills

RESEARCH FOCUS

Focus on modelling of single and multiphase flow in porous media. Both fractured and unfractured media are considered. Higher order methods are used to solve the flow and transport equations. The mixed finite element (MFE) method is used to solve for the Darcy's equation in both the matrix and the fractures. The Discontinuous Galerkin (DG) method is used to solve the mass transport equation with an explicit time discretization. To overcome the Courant-Freidrichs-Levy (CFL) condition in the small fracture elements, an implicit time discretization is used inside the fractures using for the first time with compressible flow a concept that we denote by Fracture Cross-Flow Equilibrium (FCFE). The FCFE approach provides accurate and consistent approach of the flow in fractured media compared to the previous CFE, single porosity and dual porosity approaches.