1st International Symposium on
Energy Challenges & Mechanics

8-10 July 2014
Aberdeen, Scotland, UK

Speaker of Session 04

RESERVOIR SIMULATION

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Researcher Engineer / Environmental Engineering / Oil & Gas

★ *Results-oriented professional with a positive demeanour and strong work ethic*

PhD in Fluid Mechanicswith applicationsto surface and subsurface Hydraulics andHydrology**;** Possess thorough knowledge of specialised theories/principles in the fields of soil physics, geosciences, geochemistry, watershed hydrology,physico-chemical and biological wastewater treatment technologies, as well as a deep understanding of multiphase flow and contaminant transport processes, problem formulations and their applications**;**Joined the Institute of Radiological Protection and Nuclear Safety (IRSN), France, in 2010, asan Environmental Researcher Engineer at the Radiation Protection Division - Nuclear Waste and Geosphere - Safety Assessment Department for Radioactive Waste Disposal Facilities and Natural Radioactivity; Now working on two-phase (liquid and gas) and liquid- and gas-components flow and transport in porous and fractured media, especially the transport of the radioactive noble gas radon at the building/soil/plant/atmosphere and rock/cavity interfaces.

Areas of Expertise

Functional Competencies

★Hydraulics of Ground and Surface Waters (Geosciences, Watershed Hydrology)

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★Agro-environmental Systemsand theirmanagement (Irrigation & Drainage, Agroforestry)
★Gas and Oil ReservoirEngineering (Characterization and Simulation)
★Sedimentary BasinModelling with evolution of Oil and Gas during its history
★CO2 Sequestration in the subsurface
★Wastewater Treatment (Water Oxidation Processes and Hydrodynamics)
★Groundwater and Geothermal Reservoirs Characterization using Noble Gases as environmental tracers
★Numerical Modelling and Software development

Professional Accomplishments

- Handled natural gas and multiphase flow related projects; designed test fixtures, performed data analysis, designed, implemented and support data acquisition solutions.
- Operated a variety of drills to remove petroleum products from the earth and to find and remove core samples for testing during oil and gas exploration.
- Conducted effective performance evaluations and suggested areas for improvement in internal processes along with possible solutions.
- Performed programs regarding the application theory and principles of environmental engineering to modify, test, and operate equipment and devices used in the prevention, control, and remediation of environmental pollution, including waste treatment and site remediation.
- Experimental validation with modifications tohydrological modelling toolsat different watershed scales (TNT2, POWER-LIQUID Hydrowide LLC).
- Developed the TOUGH2/EOS7Rn model for simulation of two-phase (liquid and gas) flow and noble gas (including radon) transport in fractured groundwater and geothermal reservoirs.

Career Snapshots

Environmental Researcher Engineer **2010 – now**
Institute of Radiological Protection and Nuclear Safety,France (Fontenay-aux-Roses)

Development and Researcher Engineer **2009 – 2010**
HydrolLogic Systems Group S.A., R&D Unit;Luxembourg

Postdoctoral fellowships and Assistant Researcher **2002 – 2008**
French Petroleum Institute (IFP); France 2002 – 2003
National Institute of Agronomic Research (INRA), France (Rennes city) 2003 – 2004
National Centre of Scientific Research (CNRS) and Hydrowide S.A.; France 2004 – 2006
National Institute of Agronomic Research (INRA); France (Montpellier city) 2006 – 2008

Educational Qualifications

Fluid Mechanics, Hydraulics and Hydrology / Ph.D (co-supervision). **1996 – 2001**
IbnTofaïl University, LMFTT, Kenitra, Morocco
Joseph Fourier University, LTHE-ENSHMG-INPG-CNRS, Grenoble, France

Fluid Mechanics / Master of Science **1994 – 1996**
IbnTofaïl University, Kenitra, Morocco

Computer Skills

Programming : Fortran 77/90 – C/C++ – Java – Matlab – R
Data Base Processing Systems : PostgreSQL – Access

Parallelization (MPI)	: MOSIX (under Linux)
CAD	: SolidWorks – AutoCAD
Fluid Mechanics	: FLUENT (ANSYS)
IndustrialAutomation	: LabVIEW (NI)
Vadoze zone (flow and transport)	: HYDRUS – SUTRA – WAVE – ANIMO 3.5 – STICS 5.0 TOUGH2, TOUGHREACT, T2VOC
Aquifer (flow and transport)	: MODFLOW – MT3DMS – FEFLOW
Sallow water flow and transport	: TELEMAC – HEC-RAS
Watershed hydrology	: TOPMODEL – MIKEFLOOD– EPA-SWMM – StormCAD
Geo-techniques	: CANOE – EPAnet – PLAXIS
Sedimentary basin models (petroleum engineering)	: CERES – THEMISPACK
Automatic Differentiator and inversion methods	: TAPENADE (INRIA) – UCODE - PEST – iTOUGH2
Geo-Statistics	: GEOLIB – R
GIS, DEM	: ArcView – ArcInfo – Map-Info – MNTSurf – SAGA

Personal Details

Date of Birth : 27 May 1972
Gender : Male
Nationality : French
Marital status : Married
Language Skills : Arabic, English, French and basic German
Driving Licence : International driving licence

References available upon request

Annexure

JOURNAL PUBLICATIONS

1 **Saâdi**, **Z.**, 2014. On the air-filled effective porosity parameter of Rogers and Nielson's (1991) bulk radon diffusion coefficient in unsaturated soils. **Health Physics** (accepted, to appear).
2 **Saâdi**, **Z.**, Gay, D., Guillevic, J., Améon, R., 2013. EOS7Rn—A New TOUGH2 module for simulating radon emanation and transport in the subsurface. **Computers & Geosciences**http://dx.doi.org/10.1016/j.cageo.2013.09.003.
3 Oehler F., P. Durand, P. Bordenave, **Z. Saâdi**, J. Salmon-Monviola, Modelling denitrification at the catchment scale. **Science of the Total Environment**, 407(5), 1726-1737, 2009.
4 Viaud V., P. Durand, P. Mérot, E. Sauboua and **Z. Saâdi**, Modeling the impact of the spatial structure of a hedge network on the hydrology of a small catchment in a temperate climate. **Agricultural Water Management**, 74(2): 135-163, 2005.
5 **Saâdi Z.** and A. Maslouhi, Modeling nitrogen dynamics in the unsaturated soils for evaluating the nitrate contamination of the Mnasra groundwater. **Advances in Environmental Research**, 7(4): 803-823, 2003.
6 Gabbouhy M., A. Maslouhi, Z. Mghazli et **Z. Saâdi**, Modélisation numérique du transport de soluté dans la zone non saturée d'un sol très sableux. **Math-Recherche& Applications**, Vol. 4, 77-90, 2002.
7 **Saâdi Z.**, A. Maslouhi, M. Zéraouli and J.-P. Gaudet, First attempts for predicting seasonal nitrate concentration variations at Mnasra aquifer (Morocco). **Environmental Technology**, 21(6): 671-680, 2000.
8 **Saâdi Z.**, A. Maslouhi, M. Zéraouli et J.-P. Gaudet, Analyse et modélisation des variations saisonnières des concentrations en nitrates dans les eaux souterraines de la nappe Mnasra (Maroc). **C. R. Acad. Sci.- Série IIa - Sciences de la Terre et des Planètes**, 329(8): 579-585, 1999.
9 **Saâdi Z.**, A. Maslouhi, M. Zéraouli et J.-P. Gaudet, Modélisation de la contamination nitratée de l'aquifère Mnasra. **Revue Marocaine de GénieCivile**, 84: 15-24, 1999.

PEER REVIEWED CONFERENCE PROCEEDINGS

1. **SaâdiZ.**, D. Gay, J. Guillevic and R. Améon. EOS7RN—A New TOUGH2 module for simulating radon emanation and transport in the subsurface. In: Finsterle et al. (Eds), Proceedings, TOUGH Symposium 2012, Lawrence Berkeley National Laboratory, Berkeley, California, September 17-19, pp. 481-489, 2012.
2. **Saâdi Z.**, C. Dupraz, R. Mulia, I. Lecomte and M. van Noordwijk. A generalized physically based approach to modeling water extraction by roots of competing plants in a 3D unsaturated soil. Application to agro-forestry systems. In: *Fourth International Symposium on Dynamics of Physiological Processes in Roots of Woody Plants*, 16-20 September 2007, University of Wales, Bangor.
3. Moret D., **Z. Saâdi** and R. Haverkamp, Determinación de los parámetroshidráulicosdelsueloa partir de la medida de la evolución temporal de la humedad a diferentesprofundidades en condicioneshomogéneas de perfildelsuelo. In: *Estudios de la Zona No SaturadadelSuelo*, J.V. Giráldez Cervera y F.J. Jiménez Hornero (Ed.), Vol. VIII, Zaragoza (Spain), pp. 133-138, 2007.
4. Viallet P., S. Debionne, I. Braud, J. Dehotin, R. Haverkamp, **Z. Saâdi**, S. Anquetin, F. Branger and N. Varado, Towards multi-scale integrated hydrological models using the LIQUID framework. In: *7th International Conference on Hydroinformatics, HIC 2006*, P. Gourbesville, J. Cunge, V. Guinot and S.-Y. Liong(Ed.), Nice (France), Research Publishing, Physical Simulation Modelling, Volume 1, pp. 542-549, 4-8 September 2006.
5. Moret D., **Z. Saâdi** and R. Haverkamp, Determination of the soil hydraulic properties by simultaneous analysis of soil water cumulative infiltration and transient soil water content. In: *European Geosciences Union EGU General ssembly*, 15-20 April 2005, Vienna, Austria, *Geophysical Research Abstracts*, vol. 9, 00070.
6. Durand P., V. Viaud, F. Tortrat et **Z. Saâdi**, 2004, Modélisation de l'effet des pratiques agricoles et de l'aménagement du paysage sur les flux d'eau et de matière dans les bassins versants. In: *Colloque BV-Futur - savoir et savoir faire sur les bassins versants - pollution de l'eau et dynamique de restauration de sa qualité en*

milieu rural. *Thème 3 : les outils de la modélisation au service de la restauration de la qualité de l'eau*, Palais des arts, Vannes (France), pp. 205-215, 20-22 Avril 2004.
7. **Saâdi Z.** et A. Maslouhi, Modélisation des transferts des fertilisants azotés dans les sols agricoles de Mnasra. In: *Eau Souterraine en Région Agricole* (*ESRA'2000*), O. Banton et G. Porel (Ed.), Session S3, Université de Poitiers (France), pp. 15-18, 13-15 Septembre 2000.

REPORTS

1. **Z. Saâdi**, " Adaptation de TOUGH2 à la modélisation de l'émanation et de transport du radon dans les sols non-saturés. Modélisation de transport du radon dans le sol par le nouveau module TOUGH2/EOS7Rn", Institut de Radioprotection et de Sûreté Nucléaire (IRSN), PRP-DGE/SEDRAN/BRN, Rapport Technique, pp. 90 + Annexes, Décembre 2011.
2. **Z. Saâdi**, "Modèle mathématique de transport du radon dans le continuum Bâtiment-Bassin Géologique-Cavité souterraine (B2GC)", Institut de Radioprotection et de Sûreté Nucléaire (IRSN), DEI/SARG/BRN, Note Technique, pp. 52, Novembre 2010.
3. F. Benedetto,M. Bruant and **Z. Saâdi**, "Functioning steps of a wastewater treatment plant under advanced infra-critical water oxidation conditions. WASA Project", HydrolLogic Systems Group S.A. (Luxembourg), pp. 15, June 2009.
4. **Z. Saâdi**, "Development and applications of a three-dimensional saturated-unsaturated lateral flow numerical simulation model at the watershed scale", LTHE- Grenoble (France), pp. 22, 2005.
5. P. Durand, L. Ruiz, S. Daniel, E. Sauboua and **Z. Saâdi**, "Systèmes d'élevage intensifs, pollution diffuse par les nitrates et le phosphore de l'eau d'un bassin versant : apport d'outils d'analyse et de simulation dans le choix des modes de gestion des effluents et des systèmes et itinéraires techniques de cultures" - Rapport INRA. ACTA, 2003.
6. **Z. Saâdi**, "A new approach for basin lithology and hydrocarbon modelling. Introduction of the unsaturated zone", IFP-Rueil-Malmaison (France), confidential report, pp. 65, 2003.
7. **Z. Saâdi**, "Study of water and solute movements in the unsaturated soils - case1: monitoring initial and boundary conditions (soil monolith); case2: natural field conditions (precipitation, evaporation)", LTHE-Grenoble (France), pp. 17, September-October 1998.
8. **Z. Saâdi**, R. Haverkamp and A. Maslouhi, "A scaling approach for hydrodynamic characterisation of the unsaturated soils of the Gharb Plain", Part II, LMFTT-Kenitra (Morocco), pp. 19, June 1998.
9. **Z. Saâdi**, R. Haverkamp and A. Maslouhi, "A scaling approach for hydrodynamic characterisation of the unsaturated soils of the Gharb Plain", Part I, LMFTT-Kenitra (Morocco), pp. 32, June 1997.
10. **Z. Saâdi**, "Modelling water infiltration and transport of water isotopes and Bromide ($H_2^{18}O$, ^2H_2O, Br^-) in a large undisturbed layered lysimeter", LTHE-Grenoble (France), pp. 55, March-June 1996.

BOOKS, BOOKS CHAPTERS

Durand P., F. Tortrat, V. Viaud et **Z. Saâdi**, 2006, Modélisation de l'effet des pratiques agricoles et de l'aménagement du paysage sur les flux d'eau et de matière dans les bassins versants. In: *Qualité de l'eau en milieu rural. Savoirs et pratiques dans les bassins versants*. Mérot Ph. (Eds.), Editions Quae, pp. 193-209.