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ACADEMIC BIOGRAPHY

Civil Engineering and Applied Mechanics

- 2009-present: **Assistant Professor** at Texas A&M University, Civil Engineering Department, geotechnical division.
 - 2006-2009: **PhD** studies in Navier Research Unity, in CERMES geotechnical group (École Nationale des Ponts et Chaussées, France), under the direction of Professor B. Gatmiri. Study of the THM-damage couplings in the Excavation Damaged Zone surrounding nuclear waste disposals. Participation in TIMODAZ project (*Thermal Impact on the Damaged Zone Around a Radioactive Waste Disposal in Clay Host Rocks*), launched by EURATOM (*European Office of Atomic Energy*).
 - 2005 - 2006: **Master of Science** in Soil and Rock Mechanics and Environmental Geomechanics (MSROE Master), from École Nationale des Ponts et Chaussées and Paris VI University (P. & M. Curie University).
 - 2002 - 2006: **Engineering degree** from **École Nationale des Ponts et Chaussées (ENPC)**, leading French school for Civil Engineering. Department of Civil Engineering, speciality in Geomechanics.
- April - July 2003: three month research training course at the *Lehrstuhl für Baustatik und Baudynamik* in the *Rheinish Westfälischen Technischen Hochschule Aachen* (LBB, RWTH, Aachen, Germany).

Philosophy

- 2003: **Second-year academic degree of philosophy, Paris I University** (Diplôme d'Études Universitaires Générales).

AWARDS

PhD Special Prize awarded by Ecole Nationale des Ponts et Chaussées (June 2010).

PROFESSIONAL AND ADMINISTRATIVE EXPERIENCE

- 2007 - 2008: representative of PhD students of CERMES.
- 2007 - 2008: elected representative of PhD students in the Scientific Board of "MODES" Doctoral School (Materials, Buildings, Durability, Environment and Structures) of Paris-Est University.
- 2006-2008: elected representative of PhD students in the Board of Teaching and Research of ENPC.
- August 2004 - July 2005: one year training period as engineer-assistant on a foundation building site (for Dumez Monaco, company of Vinci Construction consortium).

TEACHING

- Fall 2010: Mechanics of Materials, undergraduate course (Texas A&M).
- Summer 2010: “Research Experience for Undergraduates” (Texas A&M).
- Spring 2010: Theory of Finite Element Analysis, graduate course (Texas A&M).
- 2007 - 2008: supervisor-assistant of geotechnical practical work for graduate engineering students, based on the use of the Finite Element software PLAXIS (ENPC).
- 2006 - 2008: tutor in Continuum Mechanics for undergraduate engineering students (ENPC).

TUTORING

- since February 2010: PhD advisor on “Anisotropy due to damage and healing” (Texas A&M).
- October 2008 – July 2009: co-supervisor of a Master of a Science dissertation on the “THM damage modelling in unsaturated porous media” (ENPC).
- April - June 2007: co-supervisor of a Master of a Science dissertation on the “Study of the combined effects of topography and sediments on the amplification of seismic movements” (ENPC).

RESEARCH WORKS

Damage in non-isothermal unsaturated porous media (PhD study, 2006 - 2009)

Development of a new damage model for non-isothermal unsaturated porous media, formulated in independent state variables (“THHMD model”). Determination of the evolution laws by the combined use of phenomenological and micro-mechanical concepts of Continuum Damage Mechanics. Definition of specific damaged intrinsic conductivities to model the influence of damage on liquid water and vapour transfers (internal length parameters). Implementation of the THHMD model in a Finite Element program (Θ-Stock). Algorithmic improvements, validation tests and parametric studies. Coordination meetings for TIMODAZ European project, launched by Euratom (*European Community of Atomic Energy*). Seminars and discussions with partners of various European countries.

Two-dimensional site effects (Master of Research dissertation, 2006)

Study of the combined effects of topography and geology on the seismic response of two-dimensional sedimentary valleys. Development of a quantitative predictive method to evaluate coupled site effects in two-dimensional configurations. Parametric study performed with HYBRID software, combining Finite Elements in the near field (FEM) and Boundary Elements in the far field (BEM).

Homogenisation of Finite Elements (three month training course in Germany, 2003)

Masonry wall modelling using a homogenisation technique. Programming of the homogenised behaviour laws in the Finite Element software ANSYS. Simulations with macro-elements.

ASSOCIATIONS AND PROFESSIONAL BODIES

- Since 2010: member of the *American Geophysical Union* (AGU). Workshops on Earth Sciences.
- since 2010: member of the *American Society for Engineering Education* (ASEE). Workshops and think tanks on engineering and academia.
- since 2010: member of the *American Society of Civil Engineers* (ASCE), including an affiliation to the *Engineering Mechanics Institute* (EMI) and to the *Geo-Institute* (G-I). Professional network, technical committees, nation-wide conferences.
- since 2010: member of the InterPore network. Scientific exchanges on porous media, yearly international conference.
- since 2009: member of IACMAG association (*International Association for Computer Methods and Advances in Geomechanics*). International conferences, advanced scientific seminars.
- since 2006: member of the alumni organization of the ENPC-graduate engineers (AAENPC).
- reviewer in *Mechanics Research Communications*, in the *International Journal of Numerical Methods for Heat and Fluid Flow*, in the *Geotechnical Testing Journal* and in the *Journal of Porous Media*.

PUBLICATIONS

International Journals with reviewing committee

- C. Arson, 2010. Using a geo-mechanical damage model to assess permeability in cracked porous media: internal length parameter issues, *Journal of Porous Media*, submitted
- C. Arson, B. Gatmiri, 2010. Numerical Study of Damage in Unsaturated Geological and Engineered Barriers, *Physics and Chemistry of the Earth*, submitted
- C. Arson, B. Gatmiri, 2010. Thermo-Hydro-Mechanical Modeling of Damage in Unsaturated Porous Media, *International Journal for Numerical and Analytical Methods in Geomechanics*, submitted
- C. Arson, B. Gatmiri, 2010. Numerical study of a thermo-hydro-mechanical model for unsaturated porous media, *Annals of Solid and Structural Mechanics*, vol.1, n.2, pp. 59-78
- C. Arson, B. Gatmiri, 2009. A mixed damage model for unsaturated porous media, *Comptes-Rendus de l'Académie des Sciences de Paris, section Mécanique*, vol. 337, pp.68-74
- B. Gatmiri, P. Maghoul, C. Arson, 2009. Site-specific Spectral Response of Seismic Movement due to Geometrical and Geotechnical Characteristics of Sites, *Soil Dynamics and Earthquake Engineering*, vol.29, n.1, pp.51-70
- C. Arson, B. Gatmiri, 2008. On damage modelling in unsaturated clay rocks, *Physics and Chemistry of the Earth*, vol.33, pp. S407-S415
- B. Gatmiri, C. Arson, 2008. Θ -Stock, a powerful tool for thermohydrmechanical behaviour and damage modelling of unsaturated porous media, *Computers and Geotechnics*, vol.35, n.6, pp. 890-915
- C. Arson, B. Gatmiri, 2008. Excavation damage in unsaturated porous media, *Key Engineering Materials, Advances in Fracture and Damage Mechanics VII.*, vol.385-387, pp.137-140
- B. Gatmiri, C. Arson, 2008. Seismic site effects by an optimized 2D BE/FE method. II. Quantification of site effects in two-dimensional sedimentary valleys, *Soil Dynamics and Earthquake Engineering*, vol.28, n.8, pp.646-661
- B. Gatmiri, C. Arson, K.V. Nguyen, 2008. Seismic site effects by an optimized 2D BE/FE method. I. Theory, numerical optimization and application to topographical irregularities, *Soil Dynamics and Earthquake Engineering*, vol.28, n.8, pp.632-645

Proceedings of international conferences

- M. Mozayan, C. Arson, B. Gatmiri, 2010. Thermal damage in unsaturated geomaterials, *Fifth International Conference on Unsaturated Soils*, Barcelona, Spain, 6-8 September 2010, 6 pages
- M. Mozayan, C. Arson, B. Gatmiri, 2010. Study of tensorial damage in a porous geomaterial, *7th European Conference on Numerical Methods in Geotechnical Engineering*, Trondheim, Norway, 2-4 June 2010, 6 pages
- C. Arson, B. Gatmiri, 2009. Numerical study of a new THM damage model for unsaturated geomaterials, in *Unsaturated Soils – Theoretical and Numerical Advances in Unsaturated Soil Mechanics*, proc. *4th Asia-Pacific Conference on Unsaturated Soils*, New-Castle, Australia, 23-25 November 2009, CRC Press, Buzzi et al. editors, p.635-640
- C. Arson, B. Gatmiri, 2009. Mechanical validation of a damage model for non isothermal unsaturated porous geomaterials, *Conference on the Impact of the Thermo-Hydro-Mechanical-Chemical Processes on the safety of underground repositories*, Luxembourg, 29th September 2009, 5 pages, accepted
- C. Arson, B. Gatmiri, 2009. Damage in unsaturated porous media: theory, algorithm and numerical application, in *Poromechanics IV, Proceedings of the 4th Biot Conference on Poromechanics*, Columbia University, New-York, USA, 8 - 10 June, 2009, Ling, Smyth and Betti eds, DESTech Publications, p. 214-219
- C. Arson, B. Gatmiri, 2009. Parametric study on the performance of a THM damage model for unsaturated porous media, *1st International Symposium on Computational Geomechanics*, Juan-les-Pins, France, 29 April - 1st May 2009, pp. 553-562
- C. Arson, B. Gatmiri, 2008. Outline of the modelling of the excavated damaged zone in geological barriers, *First European Conference on Unsaturated Soils*, Durham, United Kingdom, 2 - 4 July 2008, *Unsaturated Soils, Advances in Geo-Engineering*, CRC Press, eds: D.G. Toll, C.E. Augarde, D. Gallipoli, S.J. Wheeler, pp. 695-701
- C. Arson, B. Gatmiri, 2007. Quantitative prediction of 2D topographical and sedimentary site effects by an optimised hybrid numerical technique, *7^{ème} Colloque National de l'Association Française du Génie Parasismique*, Paris, France, 4 - 6 July 2007, communication n. A005, 8 pages
- C. Arson, B. Gatmiri, 2007. Quantification of seismic site effects in two-dimensional irregular configurations, *4th International Conference on Earthquake Geotechnical Engineering*, Thessaloniki, Greece, 25 - 28 June 2007, communication n. 1195, 12 pages
- C. Arson, B. Gatmiri, 2007. Quantitative prediction of site effects in sedimentary valleys by an optimised 2D hybrid method, *5th International Conference on Seismology and Earthquake Engineering*, Tehran, Iran, 13 - 16 May 2007, session SE, n.3, 9 pages