

# Publications of Lorenzo Sanavia

## Peer-reviewed international journals

Kakogiannou E., L. Sanavia, F. Nicot, F. Darve, B.A. Schrefler (2016) *A porous media finite element approach for soil instability including the second-order work criterion*, Acta Geotechnica. 11: 805-825. DOI: 10.1007/s11440-016-0473-5.

Cao, T. D., Sanavia, L., and Schrefler, B. A. (2016) *A thermo-hydro-mechanical model for multiphase geomaterials in dynamics with application to strain localization simulation*. Int. J. Numer. Meth. Engng, 107: 312–337. doi: 10.1002/nme.5175.

Lazari, M., Sanavia, L., and Schrefler, B. A. (2015) *Local and non-local elasto-viscoplasticity in strain localization analysis of multiphase geomaterials*. Int. J. Numer. Anal. Meth. Geomech., 39: 1570–1592. doi: 10.1002/nag.2408.

Schrefler B.A., F. Pesavento, L. Sanavia, G. Sciumè, S. Secchi and L. Simoni, *A general framework for modelling long term behaviour of earth and concrete dams*, Frontiers of Architecture and Civil Engineering in China. 5(1), 41-52, 2011. DOI 10.1007/s11709-010-0070-x.

Gawin D., L. Sanavia, *Simulation of cavitation in water saturated porous media considering effects of dissolved air*. Transport in porous media, 81, 141-160, 2010. DOI: 10.1007/s11242-009-9391-4.

Gawin D., Sanavia L. *A unified approach to numerical modelling of fully and partially saturated porous materials by considering air dissolved in water*. Computer Modeling in Engineering & Sciences, 53(3), 255-302, 2009.

Sanavia L. *Numerical Modelling of a Slope Stability Test by Means of Porous Media Mechanics*, Engineering Computations, 26(3), 245-266, 2009.

Sanavia L., B. François, R. Bortolotto, L. Luison, L. Laloui, *Finite element modelling of thermo-elasto-plastic water saturated porous materials*, Journal of Theoretical and Applied Mechanics, 38(1-2), 7-24, 2008. <http://www.imbm.bas.bg/tm/jtam/vol.38-1-2.php>.

Cola S., L. Sanavia, P. Simonini, B.A. Schrefler, *Coupled thermo-hydro-mechanical analysis of Venice lagoon marshes*. Water Resources Research, 44, W00C05, 2008. DOI: 10.1029/2007WR006570.

Zhang H.W., Qin J.M., Sanavia L., Schrefler B.A., *Some theoretical aspects of strain localization analysis of multiphase porous media with regularized constitutive models*, Mechanics of Advanced Materials and Structures14(2), 107-130, 2007. DOI: 10.1080/15376490600688771.

Sanavia L., F. Pesavento, B.A. Schrefler, *Finite element analysis of non-isothermal multiphase geomaterials with application to strain localisation simulation*, Computational Mechanics, 37 (4), 331-348, 2006 (DOI 10.1007/s00466-005-0673-6).

Schrefler B.A., Zhang H.W., Sanavia L., *Interaction between different internal length*

*scales in fully and partially saturated porous media*, International J. for Numerical and Analytical Methods in Geomechanics, 30, 45-70, 2006 (DOI:10.1002/nag.474).

Sanavia L., F. Pesavento, B.A. Schrefler, *Finite element analysis of strain localization in multiphase materials*, Revue européenne de génie civil, 9, (5-6), 767-778, 2005. (Now European Journal of Environmental and Civil Engineering). ISSN: 1774-7120. ISBN: 2-7462-1271-4. DOI: 10.1080/17747120.2005.9692781.

Sanavia L., B.A. Schrefler, P. Steinmann, *A formulation for an unsaturated porous medium undergoing large inelastic strains*, Computational Mechanics, 28, (2), 137-151 2002.

Schrefler B.A., L. Sanavia, *Coupling equations for water saturated and partially saturated geomaterials*, Revue française de génie civil, 6, 975-990, 2002. DOI: 10.1080/12795119.2002.9692727.

<http://www.tandfonline.com/doi/abs/10.1080/12795119.2002.9692727>

Sanavia L., B.A. Schrefler, *A finite element model for water saturated and partially saturated geomaterials*, Revue française de génie civil, 6, 1083-1098, 2002. DOI: 10.1080/12795119.2002.9692733.

<http://www.tandfonline.com/doi/abs/10.1080/12795119.2002.9692733>

Zhang H.W., Sanavia L., Schrefler B.A., *Numerical analysis of dynamic strain localisation in initially water saturated dense sand with a modified generalised plasticity model*. Computers and Structures (79), 441-459, 2001. DOI: 10.1016/S0045-7949(00)00144-9.

Schrefler B.A., Zhang H.W., Sanavia L., *Fluid-structure interaction in the localisation of Saturated porous media*, ZAMM Zeitschrift für Angewandte Mathematik und Mechanik (Journal of Applied Mathematics and Mechanics), 79, 1999, 7, 481-484. DOI: 10.1002/(SICI)1521-4001(199907)79:7<481::AID-ZAMM481>3.0.CO;2-B.

Zhang H.W., Sanavia L., Schrefler B.A., *An internal length scale in dynamic strain localisation of multiphase porous media*, International J. Mechanics of Cohesive-Frictional Materials, 4, 1999, 443-460.

Gawin D., Sanavia L., Schrefler B.A., *Cavitation modelling in saturated geomaterials with application to dynamic strain localisation*, International J. for Numerical Methods in Fluids, 27, 1998, 109-125. DOI: 10.1002/(SICI)1097-0363(199801)27:1/4<109::AID-FLD653>3.0.CO;2-M.

Schrefler B.A., Sanavia L., Majorana C.E., *A multiphase medium model for localization and post localization simulation in geomaterials*, International J. Mechanics of Cohesive-Frictional Materials and Structures, 1, 1996, 95-114. DOI: 10.1002/(SICI)1099-1484(199601)1:1<95::AID-CFM5>3.0.CO;2-D.

<http://onlinelibrary.wiley.com/doi/10.1002/%28SICI%291099-1484%28199601%291:1%3C95::AID-CFM5%3E3.0.CO;2-D/abstract>.

Schrefler B.A., Majorana C.E., Sanavia L., *Shear band localization in saturated porous media*, Archives of Mechanics ,47, 3, 1995, 577-599. ISSN 00373-2029.

<http://am.ippt.gov.pl/index.php/am>

### Paper in National Journals

D. Gawin, L. Sanavia, *Mathematical model of hydro-thermal phenomena in porous media, considering air dissolved in water.* Building Physics in Theory and Practice, Vol. 2, 53-60, ISSN-1734-4891, Lódz, Poland, 2007.

### Proceedings of International Conferences

Lazari M., L. Sanavia (2015), *Multiphase analysis of strain localization with regularized models*, IV Int. Conf. on Particle-based methods. Fundamentals and Applications, Particles 2015. Barcelona, 28-30 September, (2015), Spain.

Cao T.D., Y. Wang, L. Sanavia and B.A. Schrefler (2015), *Mixed finite element formulation for non-isothermal porous media in dynamics*, IV Int. Conf. on Particle-based methods. Fundamentals and Applications, Particles 2015. Barcelona, 28-30 September, 2015, Spain.

Kakogiannou E. M. Lora, L. Sanavia (2015), *Hydro-mechanical continuum modelling of an experimental slope with a material stability criterion*, IV Int. Conf. on Particle-based methods. Fundamentals and Applications, Particles 2015. Barcelona, 28-30 September, 2015, Spain.

Cao T.D., L. Sanavia and Y. Wang (2015), *Strain localization simulation with temperature effects for multiphase geomaterials in dynamic analysis*, EMI 2015 - Engineering Mechanics Institute Conference - Stanford University, June 16-19, 2015, USA.

Lazari M., L. Sanavia, B.A. Schrefler (2015), *Numerical aspects of non-local viscoplasticity*, EMI 2015 - Engineering Mechanics Institute Conference - Stanford University, June 16-19, 2015, USA.

Tamagnini R., Switala B. M., Wu W., Sanavia L. (2015). *A new numerical approach for bio-engineered slopes*, XVI European Conference on Soil Mechanics and Geotechnical Engineering ECSMGE 2015, 13-17 September 2015, Edinburgh, UK.

Cao T.D., L. Sanavia (2015), *Modelling multiphase geomaterials under frictional heating with application to rapid landslide*. Proc. International Conference Innovations in Constructions CIGOS, May 11-12, 2015, Paris. Edited by Cuong Ha Minh and Frédéric Ragueneau. ISBN: 978-2-7466-7235-2

Lazari M., Sanavia L., B.A. Schrefler (2014). *Viscoplastic regularization of strain localization in fluid-saturated porous media*. 11th World Congress of Computational Mechanics WCCM 2014, 20-25 July 2014, Barcelona (E), pages 3495 - 3503. (*Invited*)

*lecture*). ISBN: 978-84-942844-7-2

Switala B., Tamagnini R., Wu W., Sanavia L. (2014). *Implementation of a constitutive equation for the finite element analysis of landslide triggered by rainfall*. 11th World Congress of Computational Mechanics WCCM 2014, 20-25 July 2014, Barcelona (E), pages 3483 - 3239. (*Invited lecture*). ISBN: 978-84-942844-7-2

Sanavia L., D.T. Cao, M. Passarotto and B.A. Schrefler (2014). *A model for non-isothermal variably saturated porous media in dynamics*, 11th World Congress of Computational Mechanics WCCM 2014, 20-25 July 2014, Barcelona (E), pages 3473 - 3482. (*Invited lecture*). ISBN: 978-84-942844-7-2

Sanavia L., Bonetto A., Laloui L. (2014). *Multi-physics modelling of the consolidation processes in variably saturated elasto-plastic soils due to high temperature*, 11th World Congress of Computational Mechanics WCCM 2014, 20-25 July 2014, Barcelona (E), pages 3230 - 3239. (*Invited lecture*). ISBN: 978-84-942844-7-2

Passarotto M., L. Sanavia (2013). *A model for the thermo-hydro-mechanical analysis of multiphase porous media in dynamics*. Proc. Int. Conf. on Computational Methods for Coupled Problems in Science and Engineering V COUPLED PROBLEMS 2013, Ibiza, Spain, 17-19 June, 2013, S. Idelsohn, M. Papadrakakis and B. Schrefler (Eds), CIMNE, Barcelona, 2013. ISBN:978-84-941407-6-1, 10 pages. (*Invited lecture*).

Sanavia, L., Bonifetto, G., Laloui, L. (2013) *Thermo-Elasto-Plastic Consolidation Analysis with Water Phase Change*. Poromechanics V: Proceedings of the Fifth Biot Conference on Poromechanics. July 10-12, 2013, Vienna, (A). Edited by Christian Hellmich; Bernhard Pichler; and Dietmar Adam. pp. 2013-2022. doi: 10.1061/9780784412992.238,  
<http://ascelibrary.org/doi/abs/10.1061/9780784412992.238>. ISBN (print): 978-0-7844-1299-2.

Sanavia L., R. Nanhorngue Nanhornguè, Schrefler B.A. *Multiphysics Modelling of Flowslides Initiation*. Proc. ICTAM 2012: The 23rd International Congress of Theoretical and Applied Mechanics. August 19-24, 2012, Beijing, China. Yilong Bai , Jianxiang Wang , Daining Fang (Eds). ISBN: 978-988-16022-3-7 (China Science Literature Publishing House).

Sanavia L., L. Luison, L. Laloui. *Thermo-Elasto-Plastic Consolidation Analysis with Water Phase Change*. Proc. 8th European Solid Mechanics Conference, Graz Austria, July 9-13, 2012. Gehard A. Holzapfel and Ray W. Ogden (Eds). ISBN: 978-3-85125-223-1.

Sanavia L., L. Luison, M. Passarotto, L. Laloui. *Multi-physics modelling of thermo-elasto-plastic multi-phase porous materials*. Proc. Symposium Vinci: Multiphysics Numerical Modeling and Computational Strategies. 17-18 May 2012, Padua, Italy.

Passarotto M., L. Sanavia, B.A. Schrefler. *Development of a model for the analysis of*

*the THM behaviour of multiphase porous media in dynamics.* Proc. Symposium Vinci: Multiphysics Numerical Modeling and Computational Strategies. 17-18 May 2012, Padua, Italy.

Sanavia L., L. Luison, L. Laloui. Finite element modelling of thermo-elasto-plastic multiphase porous materials. Int. Conf.: Trends & Challenges in Computational Mechanics TCCM2011. 12-14 September 2011, Padua, Italy. ISBN: 978-88-96477-22-9

Sanavia L., L. Luison, L. Laloui. Multi-physics modelling of thermo-elasto-plastic saturated/unsaturated porous materials. Int. Conf. on Computational Methods for Coupled Problems in Science and Engineering COUPLED PROBLEMS 2011, B. Schrefler , E. Oñate and M. Papadrakakis (Eds), CIMNE, Barcelona, 2011. <http://congress.cimne.com/coupled2011/proceedings/pdfs/a214.pdf>

Luison L., M. Passarotto, B. François, L. Sanavia, L. Laloui. *Finite element modelling of thermo-elasto-plastic unsaturated porous materials with application to nuclear waste disposal.* ECCM 2010 IV European Conference on Computational Mechanics, Paris, France, May 16-21, 2010.

Sanavia L., L. Laloui, M. Passarotto, L. Luison, B. François, *Coupled hydro-thermo-mechanical analysis of a deep radioactive waste disposal based on porous media mechanics*, Int. Conf. on Computational Methods for Coupled Problems in Science and Engineering COUPLED PROBLEMS 2009, B. Schrefler , E. Oñate and M. Papadrakakis (Eds), CIMNE, Barcelona, 2009

Schrefler B.A., F. Pesavento, L. Sanavia, S. Secchi and L. Simoni, *A general framework for modelling long term behaviour of earth and concrete dams*, 2nd Int. Conf. LONG TERM BEHAVIOUR OF DAMS LTBD09, 12–13 October 2009, Graz, Austria.

Gawin D., L. Sanavia, B.A. Schrefler, *A multiphase approach for a unified modelling of fully and partially saturated porous materials by considering air dissolved in water*, Int. Conf. CMM-2009 – Computer Methods in Mechanics 18–21 May 2009, Zielona Góra, Poland, 2009.

Sanavia L., D. Gawin, B.A. Schrefler, *Multiphysics modelling of partially saturated geomaterials*, Proc. Eccomas Thematic Conference MHM2007 Modelling of Heterogeneous Materials with applications in construction and biomedical engineering, Eds M. Jirasec, Z. Bittnar, H. Mang, Prague, 25-27 June 2007, pp. 36-37, 2007. (Plenary Lecture).

Gawin D., L. Sanavia, Mathematical model of hydro-thermal phenomena in porous media, considering air dissolved in water. Building Physics in Theory and Practice", Vol. 2, 53-60, ISSN-1734-4891, Lódz, Poland, 2007.

Sanavia L., F. Pesavento, B.A. Schrefler, D.Gawin, *Numerical modelling of hygro-thermal behaviour and deformations of soils by means of mechanics of multiphase porous media*, Workshop "Small deformations in deep foundations in engineering

practice in framework of FEM", Szklarska Porba (Poland), 10-13 March, 2005, vol.1, pp. 3-29, 2008. (Invited lecture).

Sanavia L., B.A. Schrefler, *Finite element analysis of the initiation of landslides with a multiphase model*, Proceedings, 3rd Biot Conference on Poromechanics, Abousleiman, Y., Cheng, A.H.-D., and Ulm, F.-J. (eds.), *Poromechanics III-Biot Centennial (1905-2005)*, A.A. Balkema, Leiden/London/New York/Philadelphia/Singapore, 397-402, 2005.

Cola S., L. Sanavia, P. Simonini, *Modelling the pore pressure response in the marshes of the Venice lagoon as a function of tide and soil evapotranspiration*. Proc. 11th IACMAG, Torino, Italy, Vol.3, pp. 101-108. 2005.

Sanavia L., B.A. Schrefler, *Finite element analysis of the initiation of landslides with a non-isothermal multiphase model*, Colloquium Lagrangianum 2004, Venice, December 4 -7 2004, Springer Verlag, 25 pp., in print. (Invited lecture).

Zhang H.W., J.M. Qin, B.A. Schrefler, L. Sanavia, *Some aspects on basic theories of strain localization analysis of multiphase porous media with regularized constitutive model*, Proc. WCCM VI, Sept. 5-10, 2004, Beijing, China, on CD. (Invited lecture).

Schrefler B.A., F. Pesavento, L. Sanavia, D. Gawin, *Multi-physics problems in thermo-hydro-mechanical analysis of partially saturated geomaterials*, Proc. NATO Advanced Workshop *Multi-physics and Multi-scale Computer Models in Non-linear Analysis and Optimal Design of Engineering Structures Under Extreme Conditions*, A. Ibrahimbegovic, B. Brank (eds.), pp.351-382, June 13-17, 2004. (Keynote lecture)

Sanavia L., F. Pesavento, B.A. Schrefler, *Strain localisation simulation in non-isothermal multiphase geomaterials*, Proc. ISSMGE International Conference From Experimental Evidence towards Numerical Modelling of Unsaturated Soils, Bauhaus University of Weimar, Germany, September 18-19 2003. T. Schanz (Ed.), Springer Proceedings in Physics, Springer-Verlag, 29-40, 2005. (Keynote lecture).

Sanavia L., D. Gawin, F. Pesavento, M. Rossetto, B.A. Schrefler, *Numerical analysis of non-isothermal multiphase geomaterials with application to strain localisation simulation of initially water saturated soils*, Proc. Complas VII. VII Int. Conf. on Computational Plasticity, Barcelona, Spain, 7-10 April 2003. pp.20, on CD. (Invited lecture).

Sanavia L., B.A. Schrefler and P. Steinmann, *A model for a partially saturated geomaterial undergoing large inelastic strains*, 3<sup>rd</sup> Joint Conference of Italian Group of Computational Mechanics and Ibero-Latin America Association of Computational Methods in Engineering, Giulianova (TE), June 2002, pp. 12, on CD.

Schrefler B.A., L. Sanavia and P. Steinmann, *Geometrical and material non linear analysis of partially saturated porous media*. 20<sup>TH</sup> International Congress of Theoretical and Applied Mechanics, ICTAM 2000, August 27 – September 2, Chicago (USA). Invited lecture. Extended summary, 3 pages. (Invited lecture)

Schrefler B., R. Scotta and L. Sanavia, *Dynamics of partially saturated soils*, Annual Workshop NDTCS, 6 pages, 1999. (Invited lecture).

Sanavia L., B.A. Schrefler, E. Stein, P. Steinmann, *Modelling of localisation at finite inelastic strain in fluid saturated porous media*. IUTAM Symposium on Theoretical and Numerical Methods in Continuum Mechanics of Porous Materials, Stuttgart, September 5-10 1999, Germany. Kluwer Academic Publishers, 239-244, 2001. (Invited lecture).

Schrefler B.A., Sanavia L., Gawin D., *Modelling of strain localisation in fully saturated soils*, Proc. 4<sup>th</sup> Int. Workshop on Localisation and Bifurcation Theory for Soils and Rocks, Gifu, Japan, 28 Sept. – 2 Oct. 1997. 305-312, Balkema 1998. (Invited lecture).

Schrefler B.A., Zhang H.W., Sanavia L., *Dynamic strain localisation of gradient dependent multiphase geomaterials*. Plasticity 99. Constitutive and Damage Modelling of Inelastic Deformation and Phase Transformation, A.S. Khan ed., NEAT Press, Fulton, Maryland, 1998, 601-604. (Invited lecture).

Schrefler B.A., Sanavia L., Gawin D., *Strain localisation modelling in fully and partially saturated porous media*, Computational Plasticity - Fundamentals and Applications, D.R.J. Owen, E. Onate and E. Hinton (eds.), CIMNE, Barcellona, 88-100, 1997. (Keynote lecture in COMPLAS V, 17-20 Marzo 1997, Spagna).

Gawin D., Sanavia L., Schrefler B.A., *A model of cavitation in saturated, isothermal porous medium*, «Coupled heat and moisture transfer in porous media», Szhansha Porcba, Poland, 4-13, 1996.

Schrefler B.A., Sanavia L., Majorana C.E., *Shear band localization in partially saturated porous media*, A.A. Balkema/Rotterdam/Brookfield ed., 1995, 147-152. (Invited lecture, NUMOG V, International Symposium on Numerical Models in Geomechanics, Davos, Svizzera, 6-8 Settembre 1995).

Schrefler B.A., Majorana C.E., Sanavia L., *Finite strain localisation in dynamics of multiphase materials*, Mecanica Computacional vol. XIV, S. Idelsohn & V. Sonzogni ed., Santa Fe, Argentina, 1994, 147-154. (Plenary lecture, MECOM'94, AMCA Ass. Argentina di Mecc. Computazionale, 8-11 Nov. 1994, Mar del Plata, Argentina).

## Abstracts in Proceedings of International Conferences

Cajuhi T., L. De Lorenzis, L. Sanavia, *Phase-Field Modeling of Fracture in partially saturated porous Media*. ECCOMAS Congress 2016 VII European Congress on Computational Methods in Applied Sciences and Engineering M. Papadrakakis, V. Papadopoulos , G. Stefanou, V. Plevris (eds.) Crete Island, Greece, 5–10 June 2016 (Invited lecture).

Cajuhi T, L. De Lorenzis, L. Sanavia (2016), *Phase-Field Modeling of Fracture in partially saturated porous Media*. Joint Annual Meeting of GAMM and DMV, Braunschweig, Germany, March 7-11, 2016. [http://www.iaa.tu-bs.de/vbach/Book-of-Abstracts\\_2016-03-04.pdf](http://www.iaa.tu-bs.de/vbach/Book-of-Abstracts_2016-03-04.pdf).

Sanavia L., Cao D. Toan, Lazari M. (2014). Finite element analysis of non-isothermal multiphase porous media in dynamics, with application to strain localisation simulation, 6th International Conference on Porous Media Interpore 2014, Milwaukee, USA, (Invited

speaker).

E. Kakogiannou, L. Sanavia, B. A. Schrefler, (2014). *Numerical modelling of hydrologically driven slope instability by means of porous media mechanics*, 11th World Congress on Computational Mechanics (WCCM XI), Barcelona, Spain, July 20–25, 2014 (*Invited lecture*).

Sanavia L., B.A. Schrefler, *Multiphysics modelling of geo-environmental engineering problems*. Int. Symposium of Computational Geomechanics COMGEO, April 29-May 1, France, 2009. (*Invited lecture*).

Sanavia L., D. Gawin, *A multiphase approach for a unified modelling of fully and partially saturated porous materials by considering air dissolved in water*. 8th World Congress of Computational Mechanics WCCM8 and 5th European Congress on Computational Methods in Applied Sciences and Engineering ECCOMAS2008, June 30 – July 5, Venice, Italy, 2008. (*Invited lecture*).

Sanavia L., B.A. Schrefler, *Modelling geo-environmental engineering problems by means of porous media mechanics*. 8th World Congress of Computational Mechanics WCCM8 and 5th European Congress on Computational Methods in Applied Sciences and Engineering ECCOMAS2008, June 30 – July 5, Venice, Italy, 2008. (*Invited lecture*).

Sanavia L., R. Ngaradoumbe Nanhornguè, B.A. Schrefler, D. Gawin, G.Sorbino, L. Cascini, *Multi-physics modelling of saturated/partially saturated geomaterials with application on flowslide initiation*. DFG FG 581 meeting: Naturals Slopes. Freudenstadt-Lauterbad, Germany, March 27-28, 2008. (*Invited speaker*).

Sanavia L., D. Gawin, B.A. Schrefler, *A multiphase approach for a unified modelling to of fully and partially saturated porous materials by considering air dissolved in water*. EUROMECH Colloquium 499: Nonlinear Mechanics of Multiphase Flow in Porous Media. Phase Transitions, Instability, Non-equilibrium, Modelling. 9-12 June, Nancy, France. 2007. (*Invited lecture*).

Sanavia L., R. Ngaradoumbe Nanhornguè, B.A. Schrefler, G.Sorbino, L. Cascini, *Numerical Analysis of Flowslides Initiation based on Porous Media Mechanics*, EUROMECH Colloquium 489: Modelling Multiphase Materials. 19-21 September, Chalmers, Sweden. 2007. (*Invited lecture*).

Sanavia L., B. A. Schrefler, G. Sorbino, L. Cascini *Finite element analysis of the initiation of flowslides in pyroclastic soils with a multiphase model*. III European Conference on Computational Mechanics ECCM-2006, Lisbon, 5-9 June, 2006.

### Abstracts in Proceedings of National Conferences

Sanavia L., Luison L., L. Laloui. Multi-physics modelling of elasto-plastic multi-phase porous materials under non-isothermal conditions. XX Convegno Italiano di Meccanica Teorica e Applicata AIMETA 2011, Bologna, September 12-15, 2011

Luison L., L. Sanavia. Implementation and validation of advanced constitutive models for

the analysis of hydro-thermo-mechanical interactions in geo-environmental engineering problems. XVIII Convegno Italiano di Meccanica Computazionale, Siracusa, September 22-24, 2010.

Sanavia L., L. Luison, Ronel Ngaradoume, M. Passarotto, R. Santagiuliana, B.A. Schrefler, Multiphysics modelling of environmental engineering problems by means of porous media mechanics. XIX Congresso AIMETA Associazione Italiana di Meccanica Teorica e Applicata Ancona, 14-17 Settembre 2009.

Sanavia L., D. Gawin, *A multiphase approach for a unified modelling of fully and partially saturated porous materials by considering air dissolved in water*, XVII Convegno Italiano di Meccanica Computazionale GIMC 2008, Alghero 10-12 Settembre 2008.

Sanavia L., D. Gawin, *A unified modelling of fully and partially saturated porous materials by considering air dissolved in water*. II Riunione del Gruppo Materiali dell'Associazione Italiana Meccanica Teorica ed Applicata (AIMETA) GMA08 Genova, 29 Febbraio e 1 Marzo 2008.

Sanavia L., D. Gawin, *Modelling of cavitation and rapid water desaturation of porous media considering effects of dissolved air*, XVII Congresso AIMETA, Brescia 11-14 Settembre 2007.

Sanavia L., D. Gawin, *Modelling of cavitation and rapid water desaturation of porous media considering effects of dissolved air*, I Riunione Gruppo Materiali dell'Associazione Italiana Meccanica Teorica ed Applicata (AIMETA) GMA07 Trento, 23 e 24 Febbraio 2007.

Sanavia L., B. A. Schrefler, G. Sorbino, L. Cascini *Numerical analysis of the initiation of flowslides with a multiphase model*. XVI Convegno Italiano di Meccanica Computazionale GIMC2006, Bologna 26-28 Giugno 2006.

Cola S., L. Sanavia, P. Simonini, *Coupled response in the round of the Venice Lagoon marshes induced by tide*, Terzo volume degli atti del CORILA, in print.

Sanavia L., M. Foffani, F. Pesavento, B.A. Schrefler, *Numerical modelling of the initiation of landslides due to increase of water pressure with a multiphase material model*, Convegno CNR – GNDI Conservazione del suolo 1974-2004 trent'anni di ricerca scientifica, Torino 7-8 giugno 2004 (abstract).

Sanavia L., B.A. Schrefler, *Numerical analysis of non-isothermal multiphase geomaterials with application to the initiation of landslides*, Proc. AIMETA – XV Convegno Italiano di Meccanica Computazionale – Genova, 21-23 Giugno 2004.

Sanavia L., F. Pesavento, B.A. Schrefler, *Finite element analysis of non-isothermal elasto-plastic multiphase geomaterials*, Aimeta '03, Ferrara, Italy, 2003.

Sanavia L., B.A. Schrefler and P. Steinmann, *A model for unsaturated porous media undergoing large inelastic strains*, XIII Italian Conference of Computational Mechanics

AIMETA, Brescia (Italy) November 13-15, 2000.

Briseghella L., L. Sanavia, B.A. Schrefler, *Analisi sismica di dighe in terra con modello multifase*, IX° Convegno Nazionale "L'Ingegneria Sismica in Italia", Torino September 20-23, 1999, Italy. pp. 5 on CD.

Sanavia L., Schrefler B.A., *Fluid-structure interaction in dynamic strain localisation of multiphase geomaterials*, XI° Convegno Italiano di Meccanica Computazionale GIMC'98, Trento 13-15 Luglio 1998, pp.4.

Majorana C.E., Sanavia L., Zavarise G., *Algoritmi di contatto per lo studio dei problemi di localizzazione*, Proceedings VIII° Convegno Italiano di Meccanica Computazionale AIMETA, Politecnico di Torino, Giugno 1994, 101-106.

Briseghella L., Majorana C.E., Sanavia L., Schrefler B.A., *Finite strain localization in dynamics of multiphase materials*, Proceedings VIII° Convegno Italiano di Meccanica Computazionale AIMETA, Politecnico di Torino, Giugno 1994, 170-175.

## Book chapters

Sanavia L., T.D. Cao. Finite element analysis of non-isothermal multiphase porous media in dynamics. In: Alert Doctoral School 2015: Coupled and multiphysics phenomena, B.A. Schrefler, L. Sanavia, F. Collin (Eds.), Alert Geomaterials INPG-3SR, Grenoble, France, 2015. ISBN: 978-2-9542517-6-9. Pp. 243-258.  
[http://alertgeomaterials.eu/data/school/2015/2015\\_ALERT\\_schoolbook.pdf](http://alertgeomaterials.eu/data/school/2015/2015_ALERT_schoolbook.pdf)

Sanavia L., Luison L., M. Passarotto, L. Laloui. Finite element modelling of thermo-elasto-plastic multiphase porous materials. In: Bytes and Science, G. Zavarise and D.P. Boso (Eds.), Cimne, Barcelona, Spain, 2012. ISBN: 978-84-940243-2-0. 12 pages.

Sanavia L., B.A. Schrefler. Finite element analysis of the initiation of landslides with a non-isothermal multiphase model. In: Mechanics, Models and Methods in Civil Engineering. Michel Fremond and Franco Maceri (eds). Series: Lecture Notes in Applied and Computational Mechanics 2012. Springer Berlin / Heidelberg, ISBN: 978-3-642-24637-1, vol. 61/2012, 123-146, DOI: 10.1007/978-3-642-24638-8\_6

Sanavia L., F. Pesavento, B.A. Schrefler, D. Gawin, *Numerical modelling of hygro-thermal behaviour and deformations of soils by means of mechanics of multiphase porous media*. In "Small deformations in deep foundations in engineering practice in framework of FEM", M. Lefik eds. vol.1, pp. 3-29, 2010. ISBN: 978-83-936000-0-7.

Sanavia L., B.A. Schrefler and P. Steinmann, *Geometrical and material non linear analysis of fully and partially saturated porous media*. Invited Chapter in "Porous Media: Theoretical, Experimental and Numerical Applications", W. Ehlers and J. Bluhm eds., Springer Verlag, 341-414, 2002.

Sanavia L., B.A. Schrefler and P. Steinmann, *A Mathematical and numerical model for finite elastoplastic deformations in fluid saturated porous media*. Invited Chapter in

"Modeling and Mechanics of Granular and Porous Materials" series of "Modeling and Simulation in Science, Engineering and Technology", G.Capriz, V.N. Ghionna and P. Giovine eds., Birkhäuser, Boston, 293-340, 2002.

Sanavia L., *Localizzazione delle Deformazioni nei Mezzi Multifase*, dissertazione presentata per il conseguimento del titolo di Dottore di Ricerca, 1997.

Pastore S., Sanavia L., Zavarise G., *Polo di Calcolo di Ingegneria Civile. Manuale di utilizzo*. 1997. Dipartimento di Costruzioni e Trasporti, Facoltà di Ingegneria, Università degli Studi di Padova (pp. 235).

Sanavia L., Zhang H.W., Schrefler B.A., *Strain localisation modelling in saturated sand samples*, Invited Chapter in: Festeschrift zum 60. Geburtstag von Prof. Dr.-Ing. Reint de Boer, Forschungsbericht aus dem fachbereich Bauwesen, University of Essen (Germany) 66, 357-366, 1995.

### **Book (eds.)**

Schrefler BA, Sanavia L., Collin F. (Eds), *Alert Doctoral School 2015: Coupled and multiphysics phenomena*, Alert Geomaterials INPG-3SR, Grenoble, France, 2015. ISBN: 978-2-9542517-6-9. Pp. 290. [http://alertgeomaterials.eu/data/school/2015/2015\\_ALERT\\_schoolbook.pdf](http://alertgeomaterials.eu/data/school/2015/2015_ALERT_schoolbook.pdf)

### **PhD thesis**

Sanavia L., Localizzazione delle Deformazioni nei Mezzi Multifase, dissertazione presentata per il conseguimento del titolo di Dottore di Ricerca, (in Italian), 1997.

### **Posters**

Gavagnin C., Sanavia L., T.D. Cao, *On some numerical issues in non-isothermal multiphase porous media modelling using the finite element method*. 27th ALERT Workshop, Aussois (Fr), October 3-5, 2016. ISBN 978-2-9542517-7-6.

Bonifetto G., A. Bonetto, L. Sanavia, L. Laloui. *Multi-physics modelling of the coupled behaviour of thermoelasto-plastic porous media with fluid phase change*. International CAE conference, October 21-22, 2013, Pacengo del Garda, Verona, Italy. [http://www.caeconference.com/poster/pdf/34\\_Bonifetto\\_Bonetto.pdf](http://www.caeconference.com/poster/pdf/34_Bonifetto_Bonetto.pdf). Poster n.34.

Passarotto M., L. Sanavia, B.A. Schrefler. *A model for thermo-hydromechanical analysis of multiphase porous media in dynamics*. International CAE conference, October 21-22, 2013, Pacengo del Garda, Verona, Italy. [http://www.caeconference.com/poster/pdf/17\\_Passarotto\\_Sanavia.pdf](http://www.caeconference.com/poster/pdf/17_Passarotto_Sanavia.pdf). Poster n. 17.

Lazari M., L. Sanavia, B.A. Schrefler. *Virtual simulation of strain localization in multiphase geomaterials by using a regularized approach*. International CAE conference, October 21-22, 2013, Pacengo del Garda, Verona, Italy. [http://www.caeconference.com/poster/pdf/12\\_Lazari\\_Sanavia.pdf](http://www.caeconference.com/poster/pdf/12_Lazari_Sanavia.pdf). Poster n. 12.

Lazari M., L. Sanavia, B.A. Schrefler. *Viscoplastic regularization in strain localization simulation of multiphase porous materials.* 24th ALERT Workshop, Aussois (Fr), September 30 - October 2, 2013. ISBN 978-2-9542517-1-4. [http://alertgeomaterials.eu/data/poster\\_session/Booklet\\_Abstracts\\_2013.pdf](http://alertgeomaterials.eu/data/poster_session/Booklet_Abstracts_2013.pdf)

Sanavia L., L. Luison, Passarotto M., L. Laloui, *Analisi Idro-Termo-Meccanica accoppiata di depositi profondi di scorie radioattive basata sulla meccanica dei mezzi porosi*, Notte europea dei ricercatori, September 28, 2012 and September 27, 2013.

Passarotto M., Sanavia L., B.A. Schrefler, A model for thermo-hydro-mechanical analysis of multiphase porous media in dynamics. 23th ALERT Workshop, Aussois (Fr), October 1-3, 2012. ISBN 978-2-9542517-0-7. [http://www.alertgeomaterials.eu/data/poster\\_session/2012/M\\_Passarotto.pdf](http://www.alertgeomaterials.eu/data/poster_session/2012/M_Passarotto.pdf)

Sanavia L., L. Luison, Passarotto M., L. Laloui, *Analisi Idro-Termo-Meccanica accoppiata di depositi profondi di scorie radioattive basata sulla meccanica dei mezzi porosi*, Notte europea dei ricercatori, September 23, 2011.

Luison L., M. Passarotto, L. Sanavia, B. Schrefler *Implementation and validation of advanced constitutive models for the analysis of hydro-thermo-mechanical interactions in geo-environmental engineering problems.* Poster n. 4 ALERT Workshop 2010 Aussois (Fr), October 4-6, 2010. <http://alert.epfl.ch/poster%20session/poster.html>

Passarotto M., L. Luison, L. Sanavia, L. Laloui, B. François. *Coupled hydro-thermo-mechanical analysis of a deep radioactive waste disposal based on porous media mechanics.* Poster n. 1 ALERT Workshop 2009 Aussois (Fr), October 12-14, 2009. <http://alert.epfl.ch/poster/session/poster.html>

Ngaradoumbe Nanhornguè R., L. Sanavia, B.A. Schrefler, L. Cascini, G. Sorbino, *Numerical Analysis of Flowslides Initiation based on Porous Media Mechanics*, Poster Session ALERT Worshop 2008, Aussois (Fr), October 6-8, 2008.

Luison L., B. François, R. Bortolotto, L. Sanavia & L. Laloui, *Finite element modelling of thermo-elasto-plastic water saturated porous materials*, Poster n.12 Session ALERT Worshop 2007.

Sanavia L., , M. Foffani, F. Pesavento, B.A. Schrefler, *Numerical modelling of the initiation of landslides due to increase of water pressure with a multiphase material model*, Workshop CNR – GNDCI Conservazione del Suolo, 1974-2004, trent'anni di ricerca scientifica, Torino 7-8 giugno 2004.

### **Internal reports or on-line pubblications**

Sanavia L., Steinmann P., Stein E., Schrefler B.A. (1997), *Finite strain localisation in water saturated porous media*, Report n°12/1997, Institut für Baumechanik und Numerische Mechanik, Universität Hannover, (D), pp. 30.

L. Sanavia, B.A. Schrefler and P. Steinmann (2001), *A Mathematical and numerical model for finite elastoplastic deformations in fluid saturated porous media*, UKL-LTM Report J2001-10 University of Kaiserslautern (D), Chair of Applied Mechanics.

L. Sanavia, B.A. Schrefler and P. Steinmann (2001), *Geometrical and material non linear analysis of fully and partially saturated porous media*, pp.42, UKL-LTM Report J2001-11 University of Kaiserslautern (D), Chair of Applied Mechanics.

L. Sanavia, B.A. Schrefler and P. Steinmann (2001), *A formulation for an unsaturated porous medium undergoing large inelastic strains*, UKL-LTM Report J2001-12 University of Kaiserslautern (D), Chair of Applied Mechanics.

L. Sanavia, (2001) *A formulation for an unsaturated porous medium undergoing large inelastic strains*, <http://paduaresearch.cab.unipd.it/1134/>

Sanavia L. (2009) *Numerical Modelling of a Slope Stability Test by Means of Porous Media Mechanics*. <http://paduaresearch.cab.unipd.it/1131/>

Gawin D., L. Sanavia (2009), *Modeling of cavitation in water saturated porous media considering effects of dissolved air*. <http://paduaresearch.cab.unipd.it/1132/>

### **Industrial research Internal Reports**

B.A. Schrefler, D. Boso, C.E. Majorana, L. Sanavia (2004), *Studio e sviluppo di sistemi e dispositivi per la traslazione in opera di manufatti con grandi luci. Caratteristiche e motivazioni della ricerca sotto il profilo tecnico-scientifico*. Rapporto di ricerca industriale per la Costruzioni Cimolai Armando S.p.A. di Pordenone, Italia. 30 dicembre 2004. pp. 67.