

ANAËL LEMAÎTRE, Ph.D.

Current Position

April 2005-Present

ICPC – Researcher – HDR – PhD advisor
Laboratoire Navier – Université Paris-Est
CNRS UMR 8205 – ENPC-ParisTech – IFSTTAR
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77420 Champs-sur-Marne
France

Research Interests: My research spans the broad area of deformation and rheology in non-crystalline materials, including metallic glasses, granular materials, suspensions, and foams. It aims to construct constitutive equations for comparison with experiments and to study elementary mechanisms of deformation on the basis of molecular dynamics simulations.

Past positions

University of California, Santa Barbara	<i>October 2000 – April 2005</i>
SPEC, CEA, Saclay	<i>October 1998 – September 2000</i>
LadHyX, École polytechnique	<i>October 1994 – September 1998</i>

Education

<u>Habilitation in Physics</u>	Université Jussieu Paris VI, France <i>November 30, 2004</i>
“Elementary Mechanisms of Deformation in Amorphous Materials”	

<u>Ph.D. in Physics</u>	École polytechnique – Palaiseau, France <i>September 1994–July 1998</i>
“Coupled Chaotic Systems: Collective Behavior and Universality” Adviser: Paul Manneville	

<u>Master in Theoretical Physics</u>	École Normale Supérieure, Paris, France <i>September 1993–July 1994</i>
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<u>Mechanical engineering degree</u>	École Nationale des Ponts et Chaussées, France <i>September 1991–July 1994</i>
Specialty: Applied mathematics and dynamical systems	

<u>Engineer degree</u>	École polytechnique, France <i>September 1988–July 1991</i>
Ranked among first 10%.	

Publications

 Over 1000 citations; H index = 21

- [1] H. Chate, A. Lemaître, P. Marcq, and P. Manneville. Non-trivial collective behavior in extensively-chaotic dynamical systems: An update. *Physica A*, 224(1-2):447–457, February 1996.
- [2] A. Lemaître, H. Chate, and P. Manneville. Cluster expansion for collective behavior in discrete-space dynamical systems. *Physical Review Letters*, 77(3):486–489, July 1996.
- [3] A. Lemaître, H. Chate, and P. Manneville. Conditional mean field for chaotic coupled map lattices. *Europhysics Letters*, 39(4):377–382, August 1997.
- [4] A. Lemaître and H. Chaté. Nonperturbative renormalization group for chaotic coupled map lattices. *Physical Review Letters*, 80(25):5528–5531, June 1998.

- [5] A. Lemaître and H. Chaté. Phase ordering and onset of collective behavior in chaotic coupled map lattices. *Physical Review Letters*, 82(6):1140–1143, February 1999.
- [6] A. Lemaître and H. Chaté. Macroscopic model for collective behavior of chaotic coupled map lattices. *Europhysics Letters*, 46(5):565–570, June 1999.
- [7] A. Lemaître and H. Chaté. Renormalization group for strongly coupled maps. *Journal of Statistical Physics*, 96(5-6):915–962, September 1999.
- [8] J. Kockelkoren, A. Lemaître, and H. Chate. Phase-ordering and persistence: relative effects of space-discretization, chaos, and anisotropy. *Physica A*, 288(1-4):326–337, December 2000.
- [9] I. Dornic, A. Lemaître, A. Baldassarri, and H. Chate. Analytical results for generalized persistence properties of smooth processes. *Journal of Physics A-mathematical and General*, 33(42):7499–7513, October 2000.
- [10] H. Yoshino, A. Lemaître, and J. P. Bouchaud. Multiple domain growth and memory in the droplet model for spin-glasses. *European Physical Journal B*, 20(3):367–395, April 2001.
- [11] V. Hakim, A. Lemaître, and K. Mallick. Giant vortices in the Ginzburg-Landau description of superconductivity. *Physical Review B*, 64(13):134512, October 2001.
- [12] A. Lemaître. Origin of a repose angle: Kinetics of rearrangement for granular materials. *Physical Review Letters*, 89(6):064303, August 2002.
- [13] A. Lemaître. Rearrangements and Dilatancy for Sheared Dense Materials. *Phys. Rev. Lett.*, 89:195503, 2002.
- [14] Anaël Lemaître and Jean Carlson. Boundary lubrication with a glassy interface. *Phys. Rev. E*, 69:061611, 2004.
- [15] C. Maloney and A. Lemaître. Subextensive Scaling in the Athermal, Quasistatic Limit of Amorphous Matter in Plastic Shear Flow. *Phys. Rev. Lett.*, 93:016001, 2004.
- [16] C. Maloney and A. Lemaître. Universal Breakdown of Elasticity at the Onset of Material Failure'. *Phys. Rev. Lett.*, 93:195501, 2004.
- [17] J. S. Langer and A. Lemaître. Dynamic model of super-Arrhenius relaxation rates in glassy materials. *Physical Review Letters*, 94(17):175701, May 2005.
- [18] G. Lois, A. Lemaître, and J. M. Carlson. Numerical tests of constitutive laws for dense granular flows. *Physical Review E*, 72(5):051303, November 2005.
- [19] Anaël Lemaître and Craig Maloney. Sum Rules for the Quasi-Static and Visco-Elastic Response of Disordered Solids at Zero Temperature. *J. Stat. Phys.*, 123:415, 2006.
- [20] C. E. Maloney and A. Lemaître. Amorphous systems in athermal, quasi-static shear. *Phys. Rev. E*, 74:016118, 2006.
- [21] A. Lemaître. Out-of-equilibrium relaxation of a time-dependent effective temperature. *Jamming, Yielding, and Irreversible Deformation in Condensed Matter*, 688:129–136, 2006.
- [22] G. Lois, A. Lemaître, and J. M. Carlson. Emergence of multi-contact interactions in contact dynamics simulations of granular shear flows. *Europhysics Letters*, 76(2):318–324, October 2006.
- [23] N. P. Bailey, J. Schiotz, A. Lemaître, and K. W. Jacobsen. Avalanche size scaling in sheared three-dimensional amorphous solid. *Phys. Rev. Lett.*, 98(9):095501, 2007.
- [24] G. Lois, A. Lemaître, and J. M. Carlson. Spatial force correlations in granular shear flow. I. Numerical evidence. *Physical Review E*, 76(2):021302, August 2007.
- [25] G. Lois, A. Lemaître, and J. M. Carlson. Spatial force correlations in granular shear flow. II. Theoretical implications. *Physical Review E*, 76(2):021303, August 2007.

- [26] A. Lemaître and C. Caroli. Plastic response of a two-dimensional amorphous solid to quasistatic shear: Transverse particle diffusion and phenomenology of dissipative events. *Phys. Rev. E*, 76(3):036104, 2007.
- [27] G. Lois, A. Lemaître, and J. M. Carlson. Momentum transport in granular flows. *Computers & Mathematics With Applications*, 55(2):175–183, January 2008.
- [28] Anaël Lemaître, Jean-Noel Roux, and Francois Chevoir. What do dry granular flows tell us about dense non-Brownian suspension rheology? *Rheologica Acta*, 48(8):925–942, October 2009.
- [29] A. Lemaître and C. Caroli. Rate-Dependent Avalanche Size in Athermally Sheared Amorphous Solids. *Phys. Rev. Lett.*, 103(6):065501, 2009.
- [30] Nicolas Roussel, Anaël Lemaître, Robert J. Flatt, and Philippe Coussot. Steady state flow of cement suspensions: A micromechanical state of the art. *Cement and Concrete Research*, 40(1):77–84, January 2010.
- [31] S. Karmakar, A. Lemaître, E. Lerner, and I. Procaccia. Predicting Plastic Flow Events in Athermal Shear-Strained Amorphous Solids. *Phys. Rev. Lett.*, 104(21):215502, May 2010.
- [32] A. Fall, A. Lemaître, F. Bertrand, D. Bonn, and G. Ovarlez. Shear Thickening and Migration in Granular Suspensions. *Physical Review Letters*, 105(26):268303, December 2010.
- [33] J. Chatteraj, C. Caroli, and A. Lemaître. Universal Additive Effect of Temperature on the Rheology of Amorphous Solids. *Physical Review Letters*, 105(26):266001, December 2010.
- [34] J. L. Barrat and A. Lemaître. Heterogeneities in amorphous systems under shear. In L. Berthier, G. Biroli, J.-Ph. Bouchaud, and W. van Saarloos, editors, *Dynamical Heterogeneities in Glasses, Colloids, and Granular Media*. International Series of Monographs on Physics, 2011.
- [35] J. Chatteraj, C. Caroli, and A. Lemaître. Robustness of avalanche dynamics in sheared amorphous solids as probed by transverse diffusion. *Phys. Rev. E*, 84(1):011501, July 2011.
- [36] Bruno Figliuzzi, Dominique Jeulin, Anaël Lemaître, Gabriel Fricout, Paul Manneville, and Jean-Jacques Piezanowski. Numerical simulation of thin paint film flow. *Journal of Mathematics in Industry*, 2(1):2:1, January 2012.
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- [39] Joyjit Chatteraj and Anaël Lemaître. Elastic Signature of Flow Events in Supercooled Liquids Under Shear. *Phys. Rev. Lett.*, 111(6):066001, August 2013.
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