

Laurent Ponson - Curriculum Vitae

Date of birth: 22 January 1980

Nationality: French

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Université Pierre et Marie Curie

4 place Jussieu, 75005 Paris

France

Education

Université Pierre et Marie Curie, Paris, France

Habilitation à Diriger des Recherches (2017)

Ecole Polytechnique, Paris, France

PhD in Physics (2003-2006), with distinction

Ecole Centrale, Paris, France

Engineering diploma (2000-2003), with distinction

Diploma of Advanced Studies in Energy: Materials, Structures, Fluids and Radiation (2003).

Université Pierre et Marie Curie, Paris, France

B.A. in Physics (2000-2002)

Research experience

Institut Jean le Rond d'Alembert, Université Pierre et Marie Curie, Paris (France), since 2011

Current positions:

Faculty at Centre National de la Recherche Scientifique (CNRS) since 2011

Head of the Solid and Structural Mechanics (MISES) group, 2013-2018

Research areas: Fracture and damage mechanics of heterogeneous materials, Homogenization of failure properties of brittle, quasi-brittle and ductile solids, complexity in the mechanics of disordered solids, quantitative fractography.

California Institute of Technology, Pasadena (USA), 2008-2010

Post-doctoral Marie Curie fellow, Graduate Aeronautical Laboratories

Fellowships granted by Caltech and then by the European Union

Mentors: Guruswami Ravichandran and Kaushik Bhattacharya

Research areas: Adhesion of heterogeneous thin films, Fracture mechanics of anisotropic media, Damage mechanics of quasi-brittle solids, Wave propagation in non-linear media.

Federal University of Rio de Janeiro, Rio de Janeiro (Brazil), 2007

Post-doctoral Lavoisier fellow, Department of Civil Engineering

Fellowship granted by the French Ministry of Foreign Affairs.

Research area: Crack kinetics in heterogeneous solids.

Commissariat à l'Energie Atomique, Saclay (France), 2003-2006

PhD thesis, SPCSI and Fast laboratory

Mentors: Jean-Pierre Hulin (advisor), Daniel Bonamy, Harold Auradou and Elisabeth Bouchaud.

Research areas: Failure of heterogeneous materials, quantitative fractography.

CNRS/Saint-Gobain Research Center, Paris (France), 2003

Masters training. *Research area: Statistical modeling of the failure of glass.*

Awards

Grand Prix I-Lab (2018) awarded by the French ministry of Education, Research & Innovation with a 330 k€ grant for the project *DeciFrac* that aims at developing innovative technologies of failure analysis and predictive maintenance.

Chercheur-Entrepreneur award (2016) of the start up connexion of the French ministry of education & research for the transfer of innovative fractographic techniques to the start-up *Tortoise*.

Marie Curie fellow (2008-2010) awarded by the European Union with a 200 k€ grant for the research project on the *Statistical Physics of cracks* (*PhyCracks* project - IOF 220494).

Lavoisier fellow (2007) awarded by the French ministry of foreign affairs.

Special mention of the Thesis Prize Daniel Guinier (2007) by Société Française de Physique.

Grants

Grants awarded as the principal investigator (for a total budget of about 1.1 M€)

I-Lab grant (2019-2021) awarded by the ministry of Education, Research and Innovation with a 330 k€ budget for the development of *new technologies in failure analysis*.

SATT-Lutech Grant (2018 - 2019) with a 30 k€ budget for the technological transfert of *a technology of structural health monitoring based on the statistical analysis of acoustic precursors to failure*.

CNRS-INSIS grant (2017 - 2018) with a 60 k€ budget for *the maturation of a technology of structural health monitoring based on the statistical analysis of acoustic precursors to failure*.

Research grant from ANDRA (2016 - 2019) with a 177 k€ budget for the project *Multi-scale investigation of fractures in argillite: Application to structural design of underground structures dedicated to the storage of nuclear waste*.

Emergences Paris grant (2014 - 2016) awarded by the city of Paris with a 170 k€ budget for the project *'Failure by design': From microstructural to macroscopic properties in failure of heterogeneous materials*.

Complex systems grant for equipments (2014) awarded by Institut des systèmes complexes d'Ile de France with a 25 k€ budget for participating to the purchase of multi-material 3D printer.

INSIS grant (2014) awarded by Institut des Sciences de l'Ingénierie et des Systèmes of CNRS with a 45 k€ budget for funding a PhD fellowship.

CAPES Brazilian grant (2014) of 22 k€ for funding the visit of a PhD student during one year.

Emergence UPMC grant (2012-2014), awarded by Université Pierre et Marie Curie with a 100 k€ budget for the project *From damage to failure in quasi-brittle materials*.

Marie Curie Integration grant (2011-2013) awarded by the European Union with a 75 k€ budget for the project *Bridging microstructural to macroscopic properties in failure of heterogeneous materials* (*Toughbridge* project - CIG 294025).

Complex systems grant (2011-2012) awarded by Institut des systèmes complexes d'Ile de France with a 50 k€ budget for the project *Crack propagation and damage in heterogeneous materials*.

Other grants:

PSL grant (2014-2016) awarded by Paris Sciences et Lettres with a 120 k€ budget for the project *Avalanches and fracture: from field theory to materials science*. Main investigator: E. Bouchaud (ESPCI)

NSF grant (2012-2015) awarded by the US government with a 335 k\$ budget for the *Quantitative predictions of ductile fracture surface roughness*. Main investigator: A. Needleman (Texas A&M)

Publications

Author of 3 patents and 45 publications in international refereed journals, including 10 in *Journal of the Mechanics and Physics of Solids* and 10 in *Physical Review Letters*. The asterisk* indicates the corresponding author. PhD students and post-doctoral scholars mentored are underlined.

International and national patents

1. Vernède S. & Ponson L. Method for characterizing the cracking mechanics of a material from the fracture surface thereof. *International patent WO2016/050871 and french patent 1459525* (2014).
2. Xia S., Ponson L., Ravichandran G. & Bhattacharya K. Adhesive tape with adhesion enhancement and directionality by material, structural and adhesive heterogeneity. *International patent WO2011/079322 and US patent 0159241* (2011).
3. Ponson L., Bonamy D. & Bouchaud E. Method and system to determine the path followed by at least one crack from one or several fracture surfaces created by the said crack(s). *International patent WO 2007/048934 and European patent EP1941257* (2007).

Invited review article

4. Ponson L.* Statistical aspects in crack growth phenomena: How the fluctuations reveal the failure mechanisms. Invited review article for the 50th years anniversary of *Int. J. Frac.* **201**, 11-27 (2016).

Publications in international refereed journals

5. Leblond J. B.,* Karma A., Ponson L. & Vasudevan A., Configurational stability of a crack propagating in a material with mode-dependent fracture energy - Part I: Mixed-mode I+III, *J. Mech. Phys. Solids* doi.org/10.1016/j.jmps.2019.02.007 (2019).
6. Dansereau V., Démery V., Berthier E., Weiss J. & Ponson L., Collective damage growth controls fault orientation in quasi-brittle compressive failure. *Phys. Rev. Lett.* (in press).
7. Ponson L.*, Shabir Z., Abdulmajid M., Van der Giessen E. & Simone A. A unified scenario for the morphology of crack paths in two-dimensional disordered solids. *Phys. Rev. E* (in press).
8. Chopin J.*, Bhaskar A., Atharv J. & Ponson L.* Depinning dynamics of crack fronts. *Phys. Rev. Lett.* **121**, 235501 (2018).
9. Grabois T.*, Neggers J., Ponson L., Hild F. & Toledo R. On the validation of integrated DIC with tapered double cantilever beam tests. *Eng. Frac. Mech.* **191**, 311-323 (2018).
10. Berthier E., Démery V. & Ponson L.* Damage spreading in quasi-brittle disordered solids: I. Localization and failure. *J. Mech. Phys. Solids* **102**, 101-124 (2017).
11. Ponson L.* & Pindra N. Crack propagation through disordered materials as a depinning transition: A critical test of the theory. *Phys. Rev. E* **95**, 053004 (2017).

12. Vasoya M., Lazarus V.* & Ponson L. Bridging micro to macroscale fracture properties in highly heterogeneous brittle solids: weak pinning versus fingering. *J. Mech. Phys. Solids* **95**, 755-773 (2016).
13. Vasoya M., Unni A. B., Leblond J. B., Lazarus V. & Ponson L.* Finite size and non-linear effects during crack pinning by heterogeneities: An analytical and experimental study. *J. Mech. Phys. Sol.* **89**, 211-230 (2016).
14. Leblond J. B.* & Ponson L. Out-of-plane deviation of a mode I+III crack encountering a tougher obstacle. *C. R. Mécanique* **344**, 521-531 (2016).
15. Xia S., Ponson L., Ravichandran G. & Bhattacharya K.* Adhesion of heterogeneous thin films. II: Adhesive heterogeneity. *J. Mech. Phys. Solids* **83**, 88-103 (2015).
16. Pallares G., George M., Ponson L., Chapuliot S., Roux S. & Ciccotti M.* Multiscale investigation of stress-corrosion crack propagation mechanisms in oxide glasses. *Corr. Reviews*, **33**, 501-514 (2015).
17. Vernède S., Ponson L.* & Bouchaud J. P. Turbulent fracture surfaces: A footprint of damage percolation? *Phys. Rev. Lett.* **114**, 215501 (2015). **Selected** in the journal *Physics - Focus*.
18. Osovski S., Srivastava A., Ponson L., Bouchaud E., Tvergaard V., Ravi-Chandar K. & Needleman A.* The effect of loading rate on ductile fracture toughness and fracture surface roughness. *J. Mech. Phys. Solids* **76**, 20-46 (2015).
19. Jeong J., Ramezani H., Sardini P., Kondo D., Ponson L. & Siitari-Kauppi M. Porous media modeling and micro-structurally motivated material moduli determination via the micro-dilatation theory. *Eur. Phys. J. ST* **224**, 1805-1816 (2015).
20. Srivastava A., Ponson L., Osovski S., Bouchaud E., Tvergaard V. & Needleman A.* Effect of inclusion density on ductile fracture toughness and roughness. *J. Mech. Phys. Solids* **63**, 62-79 (2014).
21. Démery V.*, Rosso A. & Ponson L. From microstructural features to effective toughness in disordered brittle solids. *EPL* **105**, 34003 (2014).
22. Leonard A., Ponson L.* & Daraio C. Wave mitigation in ordered networks of granular chains', *J. Mech. Phys. Solids* **73**, 103-117 (2014).
23. Leonard A., Ponson L. & Daraio C.* Exponential stress mitigation in structured granular composites. *Extreme Mech. Lett.* **1**, 23-28 (2014). Selected for the **cover** of the first issue of the journal.
24. Ponson L., Cao Y., Bouchaud E., Tvergaard V. & Needleman A. Statistics of ductile fracture surfaces: The effect of material parameters. *Int. J. Frac.* **184**, 137-149 (2013).
25. Xia S., Ponson L., Ravichandran G. & Bhattacharya K.* Adhesion of heterogeneous thin films. I: Elastic heterogeneity. *J. Mech. Phys. Solids* **61**, 838-851 (2013).
26. Vasoya M., Leblond J. B.* & Ponson L. A geometrically nonlinear analysis of coplanar crack propagation in some heterogeneous medium', *Int. J. Solids Struct.*, **50**, 371-378 (2013).
27. Xia S., Ponson L.*, Ravichandran G. & Bhattacharya K. Toughening and asymmetry in peeling of heterogeneous adhesives. *Phys. Rev. Lett.* **108**, 196101 (2012).
28. Poon B., Ponson L.*, Zhao J. & Ravichandran G. Damage accumulation and hysteretic behavior of MAX phase materials. *J. Mech. Phys. Solids* **59**, 2238-2257 (2011).
29. Lechenault F., Rountree C. L., Cousin F., Bouchaud J.-P., Ponson L. & Bouchaud E. Evidence of water penetration in silica during stress corrosion fracture. *Phys. Rev. Lett.* **106**, 165504 (2011).

30. Pallares G., Grimaldi A., George M.*, Ponson L. & Ciccotti M. Quantitative analysis of crack closure driven by Laplace pressure in silica glass', *J. Am. Ceramic Soc.* **94**, 2613-2618 (2011).
31. Ponson L., Boechler N., Lai Y. M., Porter M. A., Kevrekidis P. G. & Daraio C. Nonlinear waves in disordered diatomic granular chains. *Phys. Rev. E* **82**, 021301 (2010).
32. Ponson L.* & Bonamy D. Crack propagation in brittle heterogeneous solids: Material disorder and crack dynamics. *Int. J. Frac.* **162**, 21-31 (2010).
33. Ponson L.* Depinning transition in failure of inhomogeneous materials. *Phys. Rev. Lett.* **103**, 055501 (2009). **Highlighted** in the *Journal Club for Condensed Matter Physics*.
34. Pallares G., Ponson L., Grimaldi A., George M., Prevot G., Marlière C. & Ciccotti M.* Crack opening profile in DCDC specimens. *Int. J. Frac.* **156**, 11-20 (2009).
35. Ponson L.*, Dienst K., Atwater H. A., Ravichandran G. & Bhattacharya K. Competing failure mechanisms in thin films: Application to layer transfer. *J. Appl. Phys.* **105**, 073514 (2009).
36. Barbier L., Bonamy D. & Ponson L.* Reply to comment on 'Cleaved surface of i-AlPdMn quasicrystals: Influence of crack tip local temperature elevation on fracture surface roughness'. *Phys. Rev. B* **78**, 216202 (2008).
37. Morel S.*, Bonamy D., Ponson L. & Bouchaud E. Transient damage spreading and anomalous scaling in mortar crack surfaces. *Phys. Rev. E* **78**, 016112 (2008).
38. Bonamy D., Santucci S. & Ponson L. Crackling dynamics in material failure as the signature of a self-organized dynamic phase transition. *Phys. Rev. Lett.* **101**, 045501 (2008).
39. Ponson L.*, Auradou H.*, Pessel M., Lazarus V. & Hulin J. P. Failure mechanisms and surface roughness statistics of fractured Fontainebleau sandstone. *Phys. Rev. E* **76**, 036108 (2007).
40. Ponson L.* Crack propagation in disordered materials: How to decipher fracture surfaces. *Ann. Phys.* **32**, 1-120 (2007).
41. Bonamy D., Ponson L., Prades S., Bouchaud E. & Guillot C. Scaling exponents for fracture surfaces in homogenous glass and glassy ceramics. *Phys. Rev. Lett.* **97**, 135504 (2006).
42. Ponson L.*, Bonamy D. & Barbier L. Cleaved surface of AlPdMn quasicrystals: Influence of the crack tip temperature elevation on fracture surface roughness. *Phys. Rev. B* **74**, 184205 (2006).
43. Bataille A. M.*, Ponson L., Gota S., Barbier L., Bonamy D., Gautier-Soyer M., Gatel C. & Snoeck E. Characterization of antiphase boundary network in Fe₃O₄ thin films : Effect on anomalous magnetic behaviour. *Phys. Rev. B* **74**, 155438 (2006).
44. Ponson L.*, Bonamy D., Auradou H., Mourot G., Morel S., Bouchaud E. & Hulin J.P. Anisotropic self-affine properties of experimental fracture surfaces. *Int. J. Frac* **140**, 27-36 (2006).
45. Bonamy D.*, Prades S., Rountree C. L., Ponson L., Dalmas D., Bouchaud E., Ravi-Chandar K. & Guillot C. Nanoscale damage during fracture in silica glass. *Int. J. Frac.* **140**, 3-13 (2006).
46. Ponson L.*, Auradou H., Vié P. & Hulin J. P. Low self-affine exponents of fractured glass ceramics surfaces. *Phys. Rev. Lett.* **97**, 125501 (2006).
47. Bonamy D.*, Prades S., Ponson L., Dalmas D., Rountree C. L., Bouchaud E. & Guillot C. Experimental investigation of damage and fracture in glassy materials at the nanometer scale. *Int. J. Materials & Product Technology* **26**, 339-352 (2006).
48. Ponson L., Bonamy D. & Bouchaud E. Two-dimensional scaling properties of experimental fracture surfaces. *Phys. Rev. Lett.* **96**, 035506 (2006).

Patent in preparation after the submission of a declaration of invention

49. Ponson L. & Berthier E. Procédé d'analyse du comportement mécanique d'une pièce ou d'une structure afin de prévoir et d'anticiper sa ruine. *French patent.*
50. Ponson L. Méthode de fractographie quantitative pour la mesure de la ténacité d'une pièce métallique à partir de l'analyse de son faciès de rupture. *French patent.*

Articles in review

51. Ponson L.*, Srivastava A., Osovski S., Bouchaud E., Tveergard V. & Needleman A. [Correlating toughness and roughness in ductile fracture](#). Submitted to *Phys. Rev. Lett.*.
52. Berthier E. & Ponson L. , Damage spreading in quasi-brittle disordered solids: II. Statistics of precursors. Submitted to *J. Mech. Phys. Solids*.
53. Konate L., Kondo D. & Ponson L.* Crack roughness predictions in 2D disordered brittle materials. Submitted to *Int. J. Solids Struct.*.
54. Vasudevan A., Grabois T., Cordeiro G., Toledo R. & Ponson L.* [A new fracture test methodology for the accurate characterization of brittle fracture properties](#). Submitted to *Int. J. Solids Struct.*.
55. Vasoya M., Lazarus V. & Ponson L.* Fingering instability in planar crack propagation, submitted to *Phys. Rev. Lett.*.

Books in preparation

Mechanics and Physics of Fracture: Multi-scale modeling of the failure behavior of solids. Ponson L. Ed., Springer, CISM School. Including the Chapter *Fracture mechanics of heterogeneous materials: Effective toughness and fluctuations*, p. 88 - 144 by Ponson L.

Ponson L. & Bouchaud E. [Fracture mechanics of heterogeneous materials: A statistical approach](#). Wiley & Sons.

Citations

Source *Google Scholar*: 1511 citations (h-index 22).

Source *ISI Web*: 891 citations (h-index 17).

Peer reviewed conference proceedings

The asterisk indicates the presenting author.*

56. Ponson L.*, Berthier E. & Démery V., Deciphering the statistics of precursors in failure of quasi-brittle materials. *Plasticity Conference, Puerto Vallarta, Mexico* (2017).
57. Ponson L.*, Vernède S. & Bouchaud J. P., Cracking the crack: What do we learn about the statistical properties of fracture surfaces ? *ICTAM Congress, Montréal, Canada* (2016).
58. Berthier E.*, Ponson L. & Dascalu C. Quasi-brittle fracture of heterogeneous materials: A nonlocal damage model. *Proc. Mat. Sci.* **3**, 1878 - 1883, *Trondheim, Norway* (2014).
59. Vasoya M.*, Lazarus V. & Ponson L. Crack front fingering during planar crack propagation in highly heterogeneous toughness field', *Proc. Mat. Sci.* **3**, 242 - 2147, *Trondheim, Norway* (2014).
60. Cao Y. & Ponson L.* Patterns of extreme events on experimental fracture surfaces: The subtle organization of the roughness of cracks. *CFM, Bordeaux, France* (2013).

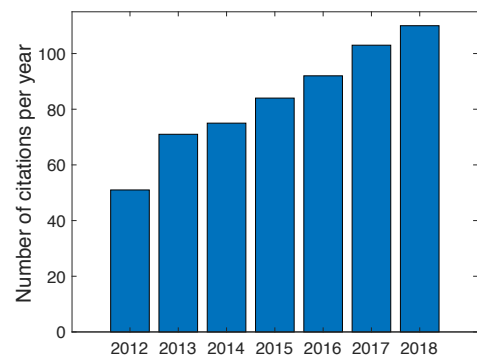


Figure: Number of citations per year (Source ISI Web)

61. Berthier E., Dascalu C. & Ponson L.* Un modèle non-local intégral dépendant du temps: Application à un réseau de fibres. *CFM, Bordeaux, France* (2013).
62. Cao Y., Vernède S.* & Ponson L. Non-Gaussian statistics and extreme events on experimental fracture surfaces. *Int. Conf. Frac., Beijing, China* (2013).
63. Vasoya M.*, V. Lazarus & L. Ponson. Propagation of tensile planar cracks in highly heterogeneous media: A numerical study. *Int. Conf. Frac., Beijing, China* (2013).
64. Leblond J. B.*, Ponson L. & Vasoya M. Second-order deformation of the front of a crack propagating in a heterogeneous material. *Conf. on Crack Paths, Gaetia, Italia* (2012).
65. Hattali L.*, Bares J., Ponson L. & Bonamy D. Low velocity surface fracture patterns in brittle material: A new mechanical instability. *Mat. Sci. Forum* **706**, 920-924, *Quebec, Canada* (2012).
66. Shabir Z., Ponson L. & Simone A.* Self-affine scaling properties of simulated intergranular cracks in brittle polycrystal. *Int. Conf. XFEM, Cardiff, UK* (2011).
67. Lechenault F., Rountree C. L., Cousin F., Bouchaud J. P., Ponson L. & Bouchaud E.* Damage of silicate glasses during stress corrosion. *J. Phys. Conf. Series* **319**, 012005, *Salt Lake City, US* (2011).
68. Pindra N.*, Ponson L. & Leblond J. B. Rupture des matériaux fragiles hétérogènes: Dynamique de fissure et résistance effective. *CFM, Besançon, France* (2011).
69. Ponson L.* Bridging microstructural to macroscopic properties in brittle failure: How can statistical physics help us? *CFM, Besançon, France* (2011).
70. Ponson L.* & Cordeiro G. Depinning Transition in Material Failure. *Int. Conf. Frac., Ottawa, Canada* (2009).
71. Bonamy D.*, Santucci S., Ponson L. & Maloy K. J. Crack growth in brittle heterogeneous materials. *Int. Conf. Frac., Ottawa, Canada* (2009).
72. Ciccotti M., Pallares G., Ponson L., Grimaldi A.* & Georges M. Mechanical effect of capillary forces in the crack tip of a DCDC specimen. *Int. Conf. Frac., Ottawa, Canada* (2009).
73. Morel S., Bonamy D., Ponson L. & Bouchaud E.* Transient damage spreading and anomalous scaling in mortar crack surfaces. *Int. Conf. Fracture, Ottawa, Canada* (2009).
74. Ponson L.*, Bonamy D., Bouchaud E., Cordeiro G., Toledo R. D. and Fairbairn E. M. R. Path and dynamics of cracks propagating in a disordered material under mode I loading. *Int. Conf. Frac. Mech. Con.* **1**, 63-67, *Catania, Italy* (2007).
75. Ponson L.*, Bonamy D., Auradou H., Bouchaud E., Guillot C., Fairbairn E. & Hulin J. P. Fracture and damage of nanophase and ceramics. *Int. Conf. Frac., Torino, Italy* (2005).

Publication in national journal

76. Jean P., Bellenger H., Burban P., Ponson L. & Evesque P. Phase transition or Maxwell's demon in granular gas?. *Poudres & grains*, **13**, p. 27-39 (2002).

Other publications

77. Ponson L. Tensile and compressive failure of heterogeneous materials: Effective properties and fluctuations. *Habilitation à Diriger des Recherches*, Université Pierre et Marie Curie (2017).
78. Ponson L. Crack propagation in disordered materials: How to decipher fracture surfaces. *PhD dissertation*, Ecole Polytechnique (2006).

Conferences and seminars

Invited speaker in various internationally recognized conferences in Mechanics, Physics, Materials Science and Mathematics.

Invited presentations during International Conferences

1. *IUTAM Symposium on size effects in damage evolution*, Copenhagen, Denmark (2018).
2. *European Physical Society Conference - Condensed Matter Division*, Berlin, Germany (2018).
3. *Plasticity conference*, Puerto Vallarta, Mexico (2017).
4. *ICTAM conference*, Montréal, Canada (2016).
5. *ECCOMAS - Computational Methods in Engineering*, Crete, Greece (2016).
6. *EuroMech colloquium on granular meta-materials*, Grenoble, France (2016).
7. *International conference on Avalanches in disordered systems*, Courmayeur, Italy (2015).
8. *FracMeet conference: From micro-scale processes to macro-scale response*, Chennai, India (2015).
9. *Complexity in Mechanics*, KITP, Santa Barbara, USA (2014).
10. *Society of Engineering Science Meeting*, Providence, USA (2013).
11. *Defects and heterogeneities in fracture & flow*, Chennai, India (2013).
12. *Materials Science & Technology Conference*, Columbus, USA (2011).
13. *International Conference on Composites*, Kottayam, India (2011).
14. *American Physical Society March Meeting*, focus session on "Tribophysics: Friction, fracture and deformation across length scales," Portland, USA (2010).
15. *IUTAM Symposium, Dynamic fracture and fragmentation*, Austin, USA (2009).
16. *Analysis of stochastic surface evolution*, Max Planck Institute, Leipzig, Germany (2009).
17. *American Physical Society March Meeting*, Denver, USA (2007).
18. *Conference on Statistical Physics in Mechanics*, Grasse, France (2006).
19. *Dynamical fractures*, Brasilia, Brazil (2006).
20. *The 8th Minerva Winter School*, Weizmann Institute of Science, Israel (2006).
21. *International Congress on the Fundamentals of Fracture*, Nancy, France (2005).

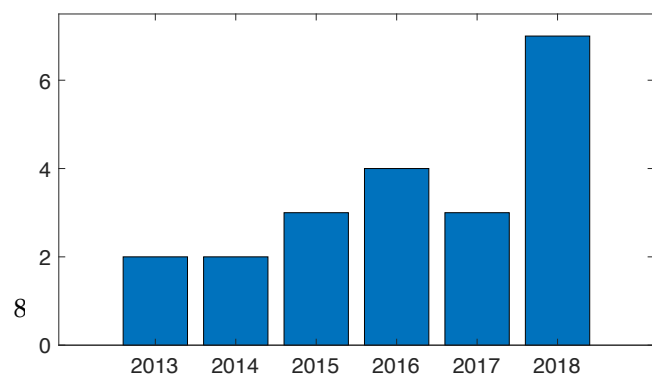
Invited presentations during International Workshops

22. *CECAM workshop on the emergence of surface structure in fracture*, Lausanne, Suisse (2018).
23. *NORDITA workshop on Crackling noise*, Stockholm, Sweden (2018).
24. *Regularized models of brittle fracture*, Paris, France (2016).
25. *Driven disordered systems*, Grenoble, France (2014).
26. *CECAM workshop on brittle fracture at the atomic scale*, Lausanne, Switzerland (2011).

Invited presentations during National Conferences

27. *Forum Innovation CETIM*, Senlis, France (2018).
28. *ASD Days on Aeronautics*, Paris, France (2018).
29. *Automation & Testing Conference on Industry 4.0*, Torino, Italy (2018).
30. *Rencontre Elastopôle - 10 years anniversary*, Tours, France (2017).
31. *Rendez-vous Carnot*, Paris, France (2017).
32. *Salon des industries*, Lyon, France (2015).

Figure: Number of invited presentations per year in international and national conferences and workshops



Selected contributed presentations in International Conferences

33. *Multiscale Materials Modeling Conference*, Osaka, Japan (2018).
34. *European Solid Mechanics Conference*, Bologna, Italy (2018).
35. *International Conference on Fracture*, Rhodes, Greece (2017).
36. *CFRAC - International Conference on Computational Fracture of Materials*, Nantes, France (2017).
37. *International Conference on Structural Integrity and Durability*, Dubrovnik, Croatia (2017).
38. *European Solid Mechanics Conference*, Madrid, Spain (2015).
39. *Society of Engineering Science Meeting*, Texas A&M, USA (2015).
40. *International Congress on Ultrasonics*, Metz, France (2015).
41. *Condensed Matter in Paris*, Paris, France (2014).
42. *Workshop on Driven disordered systems*, Grenoble, France (2014).
43. *International Conference on Fracture*, Beijing, China (2013).
44. *Workshop on Materials' Deformation (2nd edition)*, Les Houches (2013).
45. *Fracture phenomena in nature and technology*, Brescia, Italia (2012).
46. *Congress on Computational Mechanics*, Sao Paulo, Brazil (2012)
47. *Workshop on Materials' Deformation: Fluctuations, Scaling, Predictability*, Les Houches (2012).
48. *Annual conference of society of engineering science*, Chicago, USA (2011).
49. *International conference on computational modeling of fracture*, Barcelona, Spain (2011).
50. *American Physical Society March Meeting*, Dallas, USA (2011).
51. *International Conference of Fracture XII*, Ottawa, Canada (2009).
52. *Material Research Society Spring Meeting*, San Francisco (2009).
53. *American Physical Society March Meeting*, Pittsburgh, USA (2009).
54. *International Congress on the Fundamentals of Fracture VIII*, Hong Kong, china (2008).
55. *Workshop on Fluctuations and scaling in materials*, Todi, Italie (2007).
56. *Conference on Fracture mechanics of concrete structures*, Catania, Italy (2007).
57. *International Conference of Fracture XI*, Turin, Italy (2005).

Selected seminars

58. *Solid Mechanics Seminar*, Indian Institute of Technology, Kanpur, India (2018).
59. *Civil Engineering Seminar*, EPLF, Lausanne, Suisse (2017)
60. *Material Sciences Seminar*, INSA, Lyon, France (2017).
61. *Séminaire de l'Institut Navier de l'Ecole des Ponts*, Champs-sur-Marne, France (2017).
62. *Material Sciences Seminar*, University of Erlangen-Nuremberg, Germany (2016).
63. *Mechanics seminar*, Université d'Orsay, France (2016).
64. *Mechanics seminar*, Institut Galilée, Paris XI university, Villetaneuse, France (2016).
65. *Engineering Mechanics Seminar*, Indian Institute of Technology, Chennai, India (2015).
66. *Seminar of the Laboratory of Statistical Physics*, Ecole Normale, Paris, France (2014).
67. *Solid Mechanics Seminar*, Ecole Polytechnique, Palaiseau, France (2014).
68. *Gulliver Seminar*, ESPCI – ParisTech, Paris, France (2014).
69. *Solid Mechanics Seminar*, University of Texas, Austin, USA (2012).
70. *Séminaire du Service de Physique de l'Etat Condensé*, CEA-Saclay, France (2011).
71. *Condensed Matter Seminar*, University of Illinois in Urbana-Champaign, USA (2010).
72. *Applied Mathematics Seminar*, Purdue University, USA (2010).
73. *Séminaire Général de Mécanique*, Institut d'Alembert, Université Pierre et Marie Curie (2010).
74. *Micromechanics Seminar*, University of Cambridge, UK (2009).
75. *Séminaire du Service de Physique et Chimie des Surfaces et Interfaces*, CEA-Saclay, France (2009).
76. *Seminar of the center of research and development of Alcan-Pechiney*, Voreppe, France (2008).
77. *Galcit Seminar*, California Institute of Technology, Pasadena, USA (2007).
78. *Séminaire du Laboratoire d'Etude des Microstructures*, ONERA, Châtillon, France (2006).
79. *Complex Systems Seminar*, Department of Physics, University of Oslo, Norway (2006).
80. *Séminaire de Physique Théorique et Modèles Statistiques*, Orsay, France (2005).

Teaching

School at the Institute of Mathematical Science, Chennai (India), 2018

Lecture on **Damage Mechanics**.

School at the International Center for Mechanical Science, Udine (Italy), 2016

Lecture on **Fracture Mechanics** of heterogeneous solids.

University Pierre et Marie Curie, Paris (France), since 2012

Teaching assistant in **Plasticity** at the master level.

Organization and supervision of **mechanics laboratory projects** for undergraduate students.

Ecole Supérieure de Physique et Chimie Industrielle, Paris (France), since 2011

Tutorial of **Solid Mechanics**.

International Summer School on Fracture Mechanics, Cargèse (France), 2010

Lecture on **Fracture Mechanics** of heterogeneous solids.

California Institute of Technology, Pasadena (USA), 2009

Teaching assistant in **Mechanics of Structures & Solids**.

Ecole Centrale, Paris (France), 2005

Teaching Assistant in **Statistical Physics** and **Quantum Mechanics**.

French Engineering Schools (Grandes Écoles) preparatory classes, 2000-2003

Physics and Mechanics. Lectures and exercises for small groups of about 10 students.

Mentoring

Mentoring of post-doctoral, PhD and undergraduate students as main advisor.

Habilitation à Diriger des Recherches

Ponson L. Tensile and compressive failure of brittle heterogeneous materials: Effective properties and fluctuations. *Habilitation à Diriger des Recherches* defended in 2017 in front of the jury:

- Jim Rice (Harvard University)
- Jay Fineberg (Jerusalem University)
- Alex Hansen (Norwegian University of Science and Technology)
- François Barthelat (MacGill University)
- Jérôme Weiss (Université Grenoble-Alpes)
- Jean-Baptiste Leblond (Université Pierre et Marie Curie)

Post-doctoral scholars

Mayya A. Precursors to localization in compressive failure of quasi-brittle materials (since 2018)

Chopin J. Peeling of heterogeneous adhesives (2014-2015)

Current position: Faculty at the Federal University of Bahia, Salvador, Brésil

Démery V. Effective toughness of brittle and quasi-brittle disordered solids (2012-2013)

Current position: Faculty at ESPCI, Paris, France

Pindra N. Avalanche dynamics of cracks in disordered solids (2011)

Current position: Faculty at the University of Lomé, Togo

Graduate students

Thesis manuscripts available on Hal and/or on my webpage.

Lebihain M. Crack roughness and collective effects in brittle failure of disordered solid (since 2016)

Co-advisor: J. B. Leblond (Sorbonne University)

Abdulmajid M. Multi-scale investigation of the failure properties of argilite (since 2016)

Aditya Vasudevan, Stick-slip fracture of polymeric solids (2014 - 2018)

Current position: Post-doctoral scholar at NorthEastern University, USA

Grabois T. Experimental fracture mechanics of cement based materials (2013-2016)

Co-advisor: G. Cordeiro & R. D. Toledo (Univ. Federal of Rio de Janeiro, Brazil)

Current position: Faculty at the Federal University of Rio de Janeiro, Brazil

Berthier E. Quasi-brittle failure of heterogeneous materials: Damage statistics and localization (2012-2015)

Current position: Post-doctoral scholar at North Carolina University, USA

Vasoya M. Study on tensile failure of highly heterogeneous brittle materials (2011-2014)

Co-advisors: J. B. Leblond (UPMC) & V. Lazarus (Orsay)

Current position: Post-doctoral scholar at Texas A&M, USA

Other PhD students :

Albertini G. Tensile failure of heterogeneous 3D printed solids (2018)

Main advisor: D. Kammer (Cornell University, USA)

Srivastava A. Mechanics and mechanisms of creep and ductile fracture (2014)

Main advisor: A. Needleman (University of North Texas, USA)

Current position: Faculty at Texas A&M University, USA

Leonard A. Controlling wave propagation through nonlinear engineered granular systems (2013)

Main advisor: C. Daraio (California Institute of Technology, USA)

Current position: Post-doctoral scholar at Washington University, USA

Undergraduate students

Supervision of students (UPMC, ENS, Ecole Centrale, MIT, IIT...) during 3 - 6 months research internship

Trivedi Y. Fracture properties of 3D printed heterogeneous solids (2018)

Maisondieu P. Precursory activity during compressive failure of heterogeneous solids (2017)

Bhawar R. Crack path in 3D printed heterogeneous solids (2017)

Boupillère C. Fractographic study of the fracture surfaces of rocks (2017)

Jog A. Study of the relaxation dynamics of crack depinning from obstacles (2016)

De Luca G. Experimental study of stick-slip dynamics of cracks in polymeric solids (2016)

Abdulmajid M. Stability of cracks in 2D brittle solids (2016)

Bordogna R. Investigation of the statistical properties of crack roughness in argilite (2016)

Roy A. Study of the pinning of cracks by patterned obstacles (2016)

Bhaskar A. Theoretical study of the dynamics of crack front depinning from obstacles (2015)

Glista E. Dynamics of peeling front on disordered substrates (2015)

Cholst B. Experimental study of damage spreading in model 2D quasi-brittle materials (2014)

Memon F. Peeling properties of heterogeneous adhesives (2014)

Unni A. Experimental investigation of the peeling properties of disordered thin films (2013)

Couzin R. Asymmetric adhesives (2012)

Konate L. Crack path predictions in disordered solids by boundary element method (2012)

Cao Y. Non-Gaussian statistics and extreme events on experimental fracture surfaces (2012)

Herradi Y. Statistical analysis of time-asymmetry of experimental fracture surfaces (2012)

De Paiva F. Predicting the trajectory of cracks in anisotropic media (2012)

Terrine W. Fracture Mechanics of quasi-brittle media: Influence of microscopic quantities (2011)

Jackson W. Crack propagation in crystal lattices (2009)

Briend R. Predicting the trajectory of a crack in an anisotropic material (2008)

Science popularization

Experimental conference [Casser en s'amusant](#) at Espace Pierre-Gilles de Gennes, Paris, France, (2017).

TV coverage for the French program $E = M6$ (May and August 2016).

Public lecture 'Casser en s'amusant' for *La nuit sciences & Lettres*, ENS-Paris, France (2016).

Public lecture 'Casser en s'amusant' at the theatre *La Reine Blanche*, Paris, France (2015).

Public lecture for the exposition 'Ruptures: Les matériaux roulent des mécaniques' at the museum *Palais de la découverte*, Paris, France (2013).

Popular Scientific work 'Motifs de rupture', book in preparation to be published by Belin (collection Echelles).

Interview for the popular scientific journal *Science & Vie*, 90-91, **1143** (2012).

Public lecture 'How things deform and break' at the *Center for Physics*, Aspen, USA (2012).

Academic services

Direction of the Solid and Structural Mechanics (MISES) group (17 faculties), 2013-2018

In charge of the scientific policy in Solid and Structural Mechanics at Institut d'Alembert.

Organization of summer schools

1. Organizer (chairman) of the summer school [Mechanics & Physics of stretchable solids](#) at Institut d'Etude Scientifiques, Cargèse, France (2018).
2. Organizer (chairman) of the CISM school [Mechanics & Physics of fracture](#) at the International Center for Mechanical Science, Udine, Italia (2016).
3. Co-organizer of the summer school [Mechanics & Physics of complex solids](#) at Institut d'Etude Scientifiques, Cargèse, France (2016).

Organization of international conference and international research program

4. Organizer of the conference [Complexity in Mechanics: Intermittency and collective phenomena in disordered solids](#), Santa-Barbara, USA (2014).
5. Scientific advisor for the three months KITP program [Avalanches, Intermittency, and nonlinear response in far-from-equilibrium solids](#), Santa Barbara, USA (2014).

Organization of workshops and symposiums during international conferences

6. Organizer of the workshop [Nouveaux défis en mécanique de la rupture](#), Paris, France (2017).
7. Organizer of the symposium *Non-linear & Statistical Physics of Fracture* at the *International Conference of Fracture*, Rhodes, Greece (2017).
8. Organizer of the symposium *Statistical Aspects of Fracture* at the *International Conference on Computational Modeling of Fracture*, Nantes, France (2017).
9. Organizer of the symposium *Statistical Physics of Fracture* at the *International Conference of Fracture*, Beijing, China (2013).
10. Organizer of the symposium *Endommagement et rupture* at *Congrès français de mécanique*, Bordeaux, France (2013).
11. Organizer of the symposium *Mécanique-Physique* at *Congrès français de mécanique*, Bordeaux, France (2013).
12. Organizer of the Workshop *Effective toughness of heterogeneous materials*, Paris, France (2012).

Member of PhD committee:

Dubois A. (advisor: D. Bonamy) CEA-Saclay, France (2018). Reviewer.

Souguir S. (advisor: K. Sab) Ecole des Ponts, France (2018).

Gimenes G. (advisor: E. Bouchaud) ESPCI, France (2018).

Zacharopoulos M. (advisor: V. Pontikis) CEA-Saclay, France (2017).

D. Massy (advisor: F. Rieutord) Université Grenoble - Alpes, France (2015).

A. Stormo (advisor: A. Hansen) Norwegian University of Science and Technology, Norway (2013).

Member of search committee: Assistant professor position at Bordeaux University, France (2013).

Referee for international journals

Referee for *Physical Review Letters*, *Physical Review B*, *Physical Review E*, *Physics Letters A*, *Journal of the Mechanics and Physics of Solids*, *International Journal of solids and structures*, *Extreme Mechanics Letters*, *European Journal of Mechanics*, *Experimental Mechanics*, *Mechanics of Materials*, *International Journal of Fracture*, *Engineering Fracture Mechanics*, *Journal of Applied Mathematics and Mechanics*, *Journal of nonlinear Science*, *Journal of Structural Geology*, *Nature Communications*.

Referee for funding agencies

Referee for the *French National Research Agency*, *Labex Physique Atomes Lumière & Matière*, *Association Nationale de la Recherche et de la Technologie*, *Grenoble Innovation Recherche*.

Organizational activities

In charge of the *Seminars of Solid Mechanics* at Institut Jean le Rond d'Alembert, France, since 2011 and several *Mechanical Engineering Seminars* and *Material Research Lectures* at CalTech, USA.

Transfer of technology and valorization

Transfer of the patented technology *Method for characterizing the cracking mechanism of a material from the fracture surface thereof* invented by Vernède S. & Ponson L. to the **start-up** [Tortoise](#) through the licence X1004 (2017).

Concours Scientifique for the start-up [Tortoise](#) co-funded in 2017.

Recipient of the prize Chercheur-Entrepreneur (2017) and the **Grand Prix I-Lab** (2018) awarded by the ministry of research & education for the successful transfer of a technology of quantitative fractography adopted by several French Industries (CETIM, Total, Vallourec, LRCCP...) for applications in failure analysis and material characterization.