

CURRICULUM VITAE

August 2019

Stefano Zapperi

Full Professor of Theoretical Condensed Matter Physics,
Coordinator of the Center for Complexity & Biosystems,
University of Milano, Italy

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30 01 1970

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Narrative bio-sketch:

Stefano Zapperi is currently professor of theoretical condensed matter physics at the University of Milano and coordinator of the Center for Complexity and Biosystems. He graduated in physics at the University of Rome "La Sapienza" and received his Ph. D. in physics from Boston University. After a postdoctoral position at ESPCI in Paris, he became tenured researcher at INFN at the University Rome and then at the University Modena and Reggio Emilia. He became then senior researcher at CNR-IREN in Milano. He has been invited as visiting scientist or visiting professor in many institutions worldwide, including Cornell University, Aalto University, ENS, Boston College, Rice University and the Weizmann Institute of Science. Prof. Zapperi is an expert in the statistical physics of complex systems and has contributed to the fields of materials science, biophysics and systems biology. His most notable contributions include the theory of the Barkhausen noise in magnets, the statistical physics of plasticity and fracture, and recent work on the physics of cancer and protein aggregation. He published more than 200 scientific papers in the top scientific journals, including 4 in Nature, 3 in Science, 4 in PNAS and 32 in Phys. Rev. Lett. gathering more than 9000 citations (scholar). In 2017, he co-authored with Caterina La Porta a book on the Physics of Cancer. Prof. Zapperi is the recipient of numerous awards including the Marie Curie Excellence Award, the Humboldt Research Awards, the Advanced Grant from the European Research Council. He was elected fellow of the American Physical Society and named Finland Distinguished Professor by the Academy of Finland. He is member of the editorial boards of JSTAT and Physical Biology. He organized several international workshops, summer schools and symposia on a variety of interdisciplinary research topics, ranging from the "Physics of Cancer" to Statistical Physics of Materials and Complex Systems. He has been elected member of the council and the executive committee of the Complex Systems Society and acted as chair of the steering committee of the Conference on Complex Systems.

Academic degrees:

1998	Ph. D. in Physics, Boston University
1994	Laurea in Physics, University of Rome "La Sapienza", Italy

Professional positions:

2015-present	Full Professor of Theoretical Physics of Matter, University of Milano, Italy
2010-2015	Senior Researcher (tenured) CNR-IREN, Milano, Italy
2008-2009	Researcher (tenured) CNR- INFN, S3, Univ. Modena Reggio Emilia, Italy
2000-2007	Researcher (tenured) INFN, SMC, Univ. Roma "La Sapienza", Italy
1998-1999	Postdoctoral fellow, ESPCI, Paris, France.
1995-1997	Research assistant, Boston University, USA

1994-1995 Teaching fellow, Boston University, USA

Other appointments:

2015-present Coordinator, Center for Complexity & Biosystems, University of Milano, Italy
2012-2017 Research leader, ISI Foundation, Torino, Italy
2007-2011 Associate research scientist, ISI Foundation, Torino, Italy

Awards and honors:

2018 Humboldt Research Award, The Alexander von Humboldt Foundation
2015 Fellow of the American Physical Society
2015-2020 Elected member of the Council, Complex Systems Society
2015-2018 Elected member of the Executive Committee, Complex Systems Society
2015-2018 Chairman of the Steering Committee, Conference on Complex Systems
2014-2018 Finland Distinguished Professor, Academy of Finland
2004 Marie Curie Excellence Award, EU (personal award of 50000€).
1997 Materials Research Society, Graduate Student Award
1995 Boston University, Goldhaber Prize

Visiting positions:

04/2017 Visiting researcher, CNRS, ENS Lyon, France
08/2015 Visiting Scientist, Cornell University, USA
07/2014 Visiting professor, UPMC, Paris, France
07/2013 Visiting professor, Aalto University, Finland
08/2013 Visiting scientist, Cornell University, USA
07-08/2011 Visiting scientist, Cornell University, USA
07-08/2010 Visiting scientist, Cornell University, USA
07/2009 Visiting scientist, Cornell University, USA
06-08/2008 Visiting scientist, Harvard University, USA
06-08/2007 Visiting scholar, Boston College, USA
09/2006 Visiting professor, Helsinki University of Technology, Finland
10/2005 Visiting fellow, KITP, University of California Santa Barbara, USA
02/2002, 12/1999 Visiting professor, UFC, Fortaleza, Brazil

Funding and grants:

Research grants:

2018-2020 PI: Italian-Israel cooperation grant (MAECI), DISORDER, with I. Procaccia, the Weizmann Institute of Science (100,000€)
2012-2018 PI: European Research Council (ERC) Advanced Grant 2011, "Size effects in fracture and plasticity" (grant of 2,500,000€ for 5 years).
2013-2014 PI: CNR Flagship project, La Fabbrica del Futuro, "Surface Nano-structured Coating for Improved Performance of Axial Piston Pumps SNAPP" (50,000€)
2014 PI: CNR Flagship project, La Fabbrica del Futuro, "Customized Heat exchanger with Improved Nano-coated surface for earth moving machines Applications (CHINA) (26,500€)
2013-2016 Co-PI: Materials World Network: Cooperative Activity in Materials Research between US Investigators and their Counterparts Abroad (MWN), NSF-CNR 09/2013-08/2016, with J. P. Sethna (Cornell), Materials World Network: Crackling noise (180,000€).
2011-2012 Coordinator: ERANET-Complexity pilot project, LOCAT "Localizing signatures of catastrophic failures", with 3 EU partners, total grant of 500,000€.
2010-2011 PI of the italian PRIN 2008 project "Tribology of nanoclusters", 64,000€.
2007-2009 Coordinator of STREP in the EU NEST Pathfinder initiative, TRIGS "Triggering of instabilities in materials and geosystems", with six EU partner, total grant of 1,700,000€.
2000-2002 PI: PAIS project, INFM, "Hysteresis in disordered ferromagnets" 38,000€

Organization grants:

- 2012 Grant from CECAM (Centre Européen de Calcul Atomique et Moléculaire) for the workshop on Computational Physics Methods for Cancer, Lausanne, Switzerland June 27-29, 2012 (with C. La Porta) (14400 CHF).
- 2012 Grant for European Science Foundation: Exploratory Workshop 2012: Physics of cancer Varenna 13-15 September 2012 (29 funded project on 250) (with C. La Porta) (14000€).
- 2006 Grant for ESF- Exploratory Workshop 2006: "Crackling noise", 14000€.
- 2002 Grant from ESF network SPHYNX for the workshop on "Depinning transition" 22000€
- 2001 Grant from VolkswagenStiftung for the workshop on "Statistical mechanics of plasticity" 20000€

Technology transfer

- 2019-2020 Proof-of Concept grant, METADESIGN, from the European Research Council (150,000€)
- 2018-present Co-founder and member of the governing board of the startup "Complexdata S.R.L". Complexdata was the winner of the G-Factor competition from Fondazione Golinelli, winner of the Startup 4.0 prize and finalist in other business competitions.
- 2017 Research contract from Samsung Design Europe on "Auxetic metamaterials" (25,000€)

Professional activities:

- 2016-present Member of the editorial board of Physical Biology
- 2003-present Member of the editorial board of Journal of Statistical Mechanics (JSTAT).
- 2013-present Member of the Complex Systems Society,
- 1994-1997, 2008-present Member of the American Physical Society (USA).
- 2007 Guest Editor European Physics Journal B, for the proceeding of Statphys 23,
- 1994-1998 Member of the Materials Research Society (USA).

Referee for grant proposals for ANR (France), INSERM (France), NSF (USA), Hungarian Academy of Science (Hungary), Alberta Ingenuity Funds (Canada), Swiss Nat. Sci. Found. (CH), European Science Foundation, European Research Council.

Conference organization:

Organization:

- 2019 Director of the Third Summer School on "Advances in Complex Systems: from ecology to economics", Lake Como School of Advanced Studies, Como Italy, July 22-26 2019 (with J. P. Bouchaud and C. La Porta).
- 2018 Organizer of the workshop: "Physicists working on cancer" Weizmann Institute of Science July 1-12 2018, Rehovot, Israel 2017 (with E. Domany, H. Levine and C. La Porta).
- 2017 Director of the Second Summer School on "Advances in Complex Systems", Lake Como School of Advanced Studies, Como Italy, July 3-7 2017, (with M. J. Alava, C. La Porta and A. Vespignani)
- 2015 Director of the Summer School on "Advances in Complex Systems", Lake Como School of Advanced Studies, Como Italy, June 29, July 3 2015, (with M. J. Alava, C. La Porta and A. Vespignani)
- 2012 Organizer of the European Science Foundation: Exploratory Workshop 2012: Physics of cancer, Varenna 13-15 September 2012 (with C. A. M. La Porta)
- 2012 Organizer of the CECAM (Centre Européen de Calcul Atomique et Moléculaire) workshop: Computational Physics Methods for Cancer, Lausanne, Switzerland June 27-29, 2012 (with C. A. M. La Porta)
- 2008 Organizer of the Symposium on "Statistical methods for materials deformation and failure", in "Multiscale Material Modeling 2008", Talahassee, USA, 27-31 October 2008 (with M. J. Alava, I.

- Groma, M.-C. Miguel).
- 2007 STATPHYS 23, Genova, July 2007 (Conference Secretary)
- 2006 Organizer of the Symposium on "Statistical approaches to irreversible deformation and failure of materials", in "Multiscale Material Modeling 2006", Freiburg, D, 18-22 September 2006 (with M. J. Alava, H. J. Herrmann, M. Zaiser).
- 2006 Organizer of the ESF Exploratory Workshop on "Crackling Noise", IEN, Torino 24-27 May 2006 (with G. Durin).
- 2004 Organizer of the Workshop on "Depinning transitions in disordered media: theory and applications", Nordita, Copenhagen DK, 22-24 April 2004 (with M. J. Alava).
- 2002 Director of the Research Workshop on "Statistical Mechanics of Plastic Deformation", ICTP, Trieste 4-7 march 2002 (with E. Aifantis, A. El Azab, P. Haener, H. Neuhauser, A. Vespignani).
- 2002 Organizer of the Workshop on Statistical aspects of hysteresis, Roma, 4-6 April 2002 (with G. Durin).

Membership in scientific advisory committees:

- 2019 Italian Conference on Complex Systems, (1-3 7 2019, Trento Italy).
- 2015 Conference on Unsolved Problems On Noise - UPON 2015 (2015, Barcelona)
- 2014 Program on "Avalanches, intermittency, and nonlinear response in far-from-equilibrium solids" at KITP (2014, Santa Barbara, USA)
- 2012 Conference on Unsolved Problems On Noise - UPON 2012 (2012, Calcutta, India)
Conference on Unsolved Problems On Noise - UPON 2008 (2008, Lyon. France)
- 2005 ICSMPR (2005, Bangalore, India).
- 2004 XIX Sitges Conference on Statistical Mechanics (2004, Sitges, Spain)

Selected invited talks and lectures:

Selected invited talks at international conferences:

1. Earthflow workshop on "Complexity in Solid Earth and Geophysical Flows", Oslo 19-20 June 2019, opening keynote "Atomic scale frictional fronts".
2. CECAM Workshop "Emergence of surface and interface structure from friction, fracture and deformation", Lausanne – CH 24-27 July 2018 "Atomic-Scale Front Propagation at the Onset of Frictional Sliding"
3. 9th Nordic Workshop on Statistical Physics: Biological, Complex and Non-Equilibrium Systems, 21-23 March 2018 "How glasses break".
4. Workshop on Physicists working on Cancer, Weizmann Institute of Science, Rehovot, Israel, 1-12 July 2018. "Tackling phenotypic plasticity in Cancer" (with C. La Porta)
5. Second International Conference on exaptation and inverse question-driven innovation, 26-28 April 2018 Palazzo Feltrinelli, Lake Garda, Italy. "Exaptation for the good and the bad: regeneration and cancer" (with C. La Porta)
6. The 20th European Conference on Mathematics for industry, Budapest, Hungary 18-22 June 2018 "Integrative analysis of pathway deregulation in obesity".
7. CECAM-Node workshop on Phase Transformations and Plasticity in Crystals: Atomistic to Continuum Models", Milano 3-4 September 2018. "Excitation spectra in crystal plasticity."
8. Cell Physics 2017, Saarbrücken, Germany 11-13 October 2017. "Tackling cell deformation, division and migration by a combination of experiments and computational models" (with C. La Porta)
9. 4th Mini-Symposium on Bioimage Informatics, Rennes, France, 27 June 2017. "Bursts of activity in collective cell migration"
10. Congresso Nazionale SIF, Trento 13 September 2017, "Bursts of activity in collective cell migration"
11. Multiscale Materials Modeling October 9-14 2016, Dijon, France, Plenary talk "Size effects in fracture and plasticity"
12. Statphys 26, Lyon, July 18-22 2016. Invited talk "Size effects in fracture and plasticity"
13. Summer School on Advanced in Complex Systems, Lake Como School of Advanced Studies, Como Italy, June 29-July 3 2015. Talk on "Size effects in fracture".

14. Workshop on Statistical Mechanics of forms and shapes” 27—30 May 2015, Mariehamn, Åland. Talk on “Deformation and fracture of graphene”
15. COMP Full Day seminar, Espoo, Finland, 24 February 2015, Plenary talk “Tackling fluctuations in materials and biosystems”
16. CLINAM 2014 Basel, June 23-25 2014. Invited talk on “Population dynamics of cancer stem cells”.
17. European Conference on Complex Systems, Barcelona, Spain 16-20 September 2013. Keynote Speaker “Crackling noise: the sound of complex systems”.
18. SES 50th Annual Technical Meeting and ASME-AMD Annual Summer Meeting Providence, USA, July 28 - 31 2013, Keynote contribution to the symposium on Slip avalanches in amorphous plasticity.
19. DPG Spring Meeting, Regensburg, Germany 10-15 March 2013. Invited talk “Elasticity and disorder for fracture size effects”
20. Aspen Center for Physics, workshop on Large Fluctuations and Collective Behavior in Solids, Aspen (USA) July 29-Aug 19 2012. “Size effect in fracture and plasticity”.
21. American Physical Society, March meeting, Boston (USA) Feb. 27-March 2 2012, “Avalanches and Clusters in crack front propagation”.
22. Keynote Lecture, Workshop on Rapid Mass Movements, Monte Verità, Ascona, CH, April 11-15 2010 “Triggering frictional slip”
23. Joint ICTP-FANAS Conference on Trends in Nanotribology, Trieste, Italy 19-24 10 2009. “Triggering frictional slip”
24. 22nd General Conference of the Condensed Matter Division of the European Physical Society, Roma, Italy 2008 “Dislocation Avalanches, Strain Bursts, and the Problem of Plastic Forming at the Micrometer Scale”
25. 8th Multimat Workshop, Roma, Italy 2008. “Dislocation Avalanches, Strain Bursts, and the Problem of Plastic Forming at the Micrometer Scale”
26. Conference on size effects and scaling in fracture, Monte Verità, Ascona, Switzerland 2008. “Role of disorder in the size scaling of material strength”.
27. Workshop on Fluctuations and Scaling in Materials, Todi, Italy, 2007. “Role of disorder in the size scaling of materials strength”
28. Workshop on complex systems, Barcelona, Spain, 2007, “Vortex polycrystals in type II superconductors”.
29. The 11th International Workshop on Vortex Matter, Wroclaw, Poland, 2006. "Vortex polycrystals in type II superconductors".
30. Workshop on Statistical Physics in Mechanics, Grasse, France, 2006. "Crack morphology in two dimensions"
31. Program on: From the Atomic to the Tectonic: Friction, Fracture and Earthquake Physics. KITP Santa Barbara, 2005. "Inertial Effects in Crackling Noise: From Magnets to Granular Media"
32. GDR: Systemes elastiques: du Desordre a la Plasticite, Vogue, France, 2005. "Grain boundaries in vortex matter".
33. ICF XIX, International conference on Fracture, Torino, March 2005. "Crack roughness and avalanche precursors in the random fuse model"
34. Ecole Thematique CNRS, Systemes complexes en Astrophysique : L'emergence de structures en milieux dilues. Chateau de Goutelas 2004. Series of lectures on "Self-organized criticality".
35. XIX SITGES CONFERENCE on Statistical Mechanics, Sitges, Spain 2004. "Jamming and depinning of interacting dislocations"
36. LAWNP 03, Salvador, Brasil, 2003 "Non-linear vortex diffusion and flux-front invasion in disordered type II superconductors"
37. Invited Lecture, Plasticity 03, Quebec, Canada, 2003. "Depinning of a dislocation pileup"
38. GDR: Systemes elastiques: du Desordre a la Plasticite, Carcassonne, France, 2002. "Collective dynamics of dislocations"
39. Workshop on Disordered systems at low temperatures and their topological properties, Helsinki, Finland 2002, "Collective dynamics of dislocations"
40. Horizons on complex systems, Messina, Italia, 2001, "Statistical models for acoustic emission"
41. JEMS'01 (Joint European Magnetic Symposia EMMA-MRM), Grenoble, France, 2001, "Microscopic foundations of the Rayleigh law of hysteresis"

42. EURESCO conference on Plasticity of Materials, Acquafredda di Maratea, Italy, 2000, "Complex dynamics of dislocation systems".
43. International Workshop on Scaling in Disordered Systems, ESPCI, Paris, Francia, 2000, "Planar cracks in the fuse model"
44. Workshop on SOC and phase transitions, ICTP, Trieste, Italia, 2000, "Driving modes in avalanching systems"
45. Workshop on nonequilibrium dynamic systems, Porto, Portugal, 1999, "Driving and dissipation in avalanche transport phenomena"
46. VIII Workshop on computational material science, S. Margherita di Pula, Sardegna, 1998, "The Barkhausen effect: A new perspective for an old problem"
47. Conference on the Dynamics of Complexity, ICTP, Trieste, Italy, 1997, "Dynamics of a ferromagnetic domain wall and the Barkhausen effect".

International schools and Ph.D/M. D. programs

1. Summer School: From nonlinear Physics to Biology and Medicine, Cargèse, Corsica (France) 9-21 July 2012.
2. Joint Master on Computational and Applied Physics, Technical University of Catalonia (UPC)/University of Barcelona (UB), Spain. Lectures on "Elasticity and disorder". Feb 16-19, 2010.
3. IGERT program, Cornell University, Lecture on "Dislocation avalanches" Nov. 17-20, 2009.
4. Ph. D. school in Physics, Helsinki University of Technology, Finland, Lectures on "Depinning Transition", 2006.
5. Summer school CNRS, Complex systems in Astrophysics, Chateau de Goutelas, France. Lectures on "Self-organized criticality". Sep. 23-26, 2004
6. Ph. D. school in Physics, Federal University of Cearà, Brasil. Lectures on "Hysteresis". Feb 15-28, 2002.

Seminars in Universities

During my career I was invited to give lectures, seminars and colloquia at a large number of institutions including (in the last 10 years): Aalto University, Boston College, Cornell University, ETH Zurich, Harvard University, Leiden University, North Carolina State University, Northeastern University, SISSA Trieste, Politecnico di Milano, University of Barcelona, University of Luxembourg, University North Carolina, University of Parma, University of Rome, University of Edinburgh, University of Montpellier, University of Syracuse, Weizmann Institute of Science.

Teaching and services:

Courses and teaching activities:

- Master course on "Advanced Biophysics", Università degli Studi di Milano 2019
- Master course on "Physics of Proteins", Università degli Studi di Milano 2016-2018
- Bachelor course on "Introduction to Statistical Physics", Università degli Studi di Milano 2016-2019
- Bachelor course on "Mathematical methods for physics", Università degli Studi di Milano 2015
- Master course on "Statistical Mechanics", Università degli Studi di Milano 2015/16
- Master course on "Biophysics", Università degli Studi di Milano, 2014-2019
- Training course on "Statistical data analysis", Università di Modena e Reggio Emilia, 2008
- Graduate course on "Statistical mechanics", Università di Modena e Reggio Emilia, 2008
- Graduate course on "Physics of complex materials", Univ. Roma "La Sapienza" 2006
- Graduate course on "Theory of Elasticity", Univ. Roma "La Sapienza", 2003
- Graduate course on "Theory of Elasticity", Univ. Roma "La Sapienza", 2002
- Grader, Statistical Mechanics, Boston University 1997
- Teaching fellow, Modern physics (1 semester), Environmental physics (1 semester), Boston University 1994-1995

Member of Habilitation committee:

- Paolo Moretti, FAU Erlangen-Nuremberg, Germany 2016
- Carlo Bianca, Ecole Normale Supérieure, Paris, France 2015
- Stephane Santucci, Ecole Normale Supérieure, Lyon, France 2014

External member in Ph.d thesis committees :

- F. P. Landes (Université Paris-Sud, 2014)
- A. Dobrinevski (Ecole Normale Supérieure, Paris, France, 2013)
- G. Mourot (Université de Bordeaux, France, 2007)
- P. Moretti (University of Edinburgh, UK, 2006),
- F. Lahaie (Université de Grenoble, France, 2000),
- A. Alencar (UFC, Fortaleza, Brazil, 1999).

Supervision of students and postdocs:

- Advisor of “Laurea triennale” (Bachelor) students:
 - E. Distante (2007); Univ. Milano
 - M. Vodret (2016); Univ. Milano
 - B. Raciti (2019); Univ. Milano
- Advisor of “Laurea” (Master) students:
 - P. Moretti (2003); Univ. Roma “La Sapienza”
 - M. Minozzi (2001); Univ. Roma “La Sapienza”
 - L. Dante (2001); Univ. Roma “La Sapienza”
 - M. Baraldi (2012); Univ. Milano.
 - G. Fatti (2016); Univ. Milano
 - M. Hoferer (2017) LMU Munich/Univ. Milano
 - B. Spelta (2019); Univ. Milano
- Advisor of Ph. D. students:
 - L. Ravazzano (2018-2020) Univ. Milano
 - C. Manzato (2008-2010); Univ. Modena e Reggio Emilia. Presently postdoctoral fellow Aalto University (Finland)
 - F. Leoni (2006-2008); Univ. Roma “La Sapienza”, Presently postdoctoral fellow, Tel Aviv University.
 - B. Cerruti (2003-2006); Univ. Roma “La Sapienza” , Presently research associate at Institute for Cancer Research and Treatment, Torino (Italy)
- Supervision of postdoctoral fellows:
 - S. Bonfanti (2016-present) University of Milano
 - F. Font-Clos (2015-present) University of Milano
 - C. Pedersen (2015-2017) Aalto University, presently postdoc at University of Innsbruck
 - O. Chepizhko (2015-2017) Aalto University, presently postdoc at University of Innsbruck
 - P. Jana (2015-2017) Aalto University, presently postdoc at Université Libre de Bruxelles.
 - A. L. Sellerio (2013-2016) Univ. Milano.
 - C. Negri (2013-2016) Univ. Milano. Presently tenured researcher at UniResearch Bergen, Norway
 - G. Costantini (2012-2017) Univ. Milano.
 - Z. Budrikis (2012-2017) ISI, Torino. Presently editor at Nature.
 - A. Taloni (2011-2016) Univ. Milano. Presently tenured researcher at CNR, Roma.
 - Z. Bertalan (2012-2015) ISI, Torino, presently developer at Medizinkraft, Vienna.
 - U. Salman (2013-2014) CNR, Milano, presently researcher at CNRS, Paris.
 - D. Vilone (2012-2013) CNR, Milano, Presently postdoctoral fellow, CNR Roma.
 - A. Benassi (2011-2012) CNR, Milano. Presently research associate, TU Dresden.
 - L. Laurson (2009-2010); ISI, Torino. Academy fellow, Aalto University.
 - A. Mughal (2008-2009); ISI, Torino. Presently tenured lecturer Aberystwyth University(UK).
 - R. Capozza (2008-2009); CNR-INFN, Modena. Presently postdoctoral fellow at SISSA

- V. Beato (2006-2009); CNR-INFM, Roma. Presently employed at Deep Blue consulting and research (Italy).
- A. Baldassarri (2003-2004); INFM, Roma. Presently tenured researcher at CNR-ISC, Roma (Italy).
- F. Colaiori (2002-2003); INFM Roma. Presently tenured researcher at CNR-ISC Roma, (Italy).

PUBLICATIONS

More than 150 publications in major peer reviewed international scientific journals and conference proceedings. Among those: 3 articles in Science, 4 articles in Nature, 3 in Nature Physics, 1 article in Nature Materials, 1 Nature Communications, 3 articles in the Proceedings of the National Academy of Sciences USA, review articles in Advances in Physics, Nature Reviews Materials and Reviews of Modern Physics, 32 papers in Physical Review Letters, 5 books chapters and 1 book.

Impact and media coverage:

Impact of the publications

My publications have received more than 6000 citations in total (ISI h-index=37, google scholar h-index=45). My work was featured in several science and popular science books including an epistemological essay (R. Frigg, Stud. Hist. Philos. Sci. 34A, 613, 2003).

Media coverage and perspectives:

My work was often covered by the media, I have been often interviewed by Italian newspapers, radio and television.

Publications on the Italian research system and outreach activities:

I have contributed to the debate on the Italian research and university system with a series of publications in newspaper and magazines and with a book (F. Sylos Labini, S. Zapperi "I ricercatori non crescono sugli alberi", Laterza 2011). I routinely participate in outreach activities to disseminate science and research problems to the public at large. Examples include participation to the Genova Science Festival (in 2005), participation to European Researchers Night (in 2010 and 2011) and contributions to online science magazines (scienzainrete).

Complete list of Publications

Books:

1. C. A. M. La Porta and S. Zapperi, The Physics of Cancer, Cambridge University Press (2017).

Book chapters:

1. S. Zapperi, C. A. M. La Porta Cancer Stem Cells Biomarkers Chapter 15 pag.305-316 in: Principles of Stem Cell Biology and Cancer: Future Applications and Therapeutics, By Tarik Regad, Thomas Sayers, Robert Rees, John Wiley & Sons, Ltd 2015.
2. S. Zapperi, C.A.M. La Porta Cancer stem cells in melanoma:biomarkers and mathematical models Chapter 10, pp 133-142, Cancer Stem Cells, edited by V.K. Rajasekhar (Wiley Press, 2013).
3. G. Durin and S. Zapperi, "The Barkhausen effect" in The Science of Hysteresis", edited by G. Bertotti and I. Mayergoyz, vol. II pp 181-267 (Academic Press, Amsterdam, 2006).
4. S. Zapperi, M. C. Miguel, P. Moretti and M. Zaiser, "Jamming and Yielding of Dislocations": from Crystal

Plasticity to Superconducting Vortex Flow" in "Jamming, Yielding and Irreversible Deformation in Condensed Matter", M. C. Miguel and M. Rubi (eds), Lect. Notes in Physics 688, 189 (Springer, Heidelberg-Berlin, 2006)

5. A. Baldassarri, F. Dalton, A. Petri, L. Pietronero, G. Pontuale and S. Zapperi "Granular shearing and Barkhausen noise", in "Traffic and Granular Flow'05", 91 (Springer, Heidelberg-Berlin, 2007)

Edited volumes:

1. C. A. M. La Porta and S. Zapperi, Cell migrations: causes and functions (Springer-Nature, 2019).
2. V. Loreto, L. Pietronero and S. Zapperi, Topical issue dedicated to Statphys 23, Eur. Phys. J. B 64, 301- 636 (2009).

Review articles:

1. A. Taloni, M. Vodret, G. Costantini and S. Zapperi. Size effects on the fracture of microscale and nanoscale materials, Nat. Rev. Materials 3, 211 (2018).
2. C. A. M. La Porta and S.Zapperi. Explaining the dynamics of tumor aggressiveness: At the crossroads between biology, artificial intelligence and complex systems Seminars in Cancer Biology 2018 July 11.
3. James P Sethna, Matthew K Bierbaum, Karin A Dahmen, Carl P Goodrich, Julia R Greer, Lorien X Hayden, Jaron P Kent-Dobias, Edward D Lee, Danilo B Liarte, Xiaoyue Ni, Katherine N Quinn, Archishman Raju, D Zeb Rocklin, Ashivni Shekhawat, Stefano Zapperi, "Deformation of crystals: Connections with statistical physics" Annual Review of Materials Research 47, 2017 (2017).
4. C. A. M. La Porta and S. Zapperi, Complexity in cancer stem cells and tumor evolution: towards precision medicine, Seminars in Cancer published online (2017).
5. A. Taloni, M. Ben Amar, S. Zapperi and C. A.M. La Porta, The role of pressure in cancer growth EPJ Plus, 130 224 (2015)
6. A. Vanossi, N. Manini, M. Urbakh, S. Zapperi, and E. Tosatti, "Modeling friction: from nano to meso scales", Rev. Mod. Phys. 85, 529–552 (2013)
7. S. Zapperi. "Current challenges for statistical physics in fracture and plasticity", Eur. Phys. J. B 85 329 (2012).
8. C.A.M. La Porta, S. Zapperi Human breast and melanoma cancer stem cells biomarkers, Cancer Letters 338, 69–73. (2013)
9. M. J. Alava, P. K. V. V. Nukala and S. Zapperi, "Size effects in statistical fracture" J. Phys. D 42, 214012 (2009).
10. M. J. Alava, P. K. V. V. Nukala and S. Zapperi, "Statistical models for fracture", Adv. Phys. 55, 349-476 (2006).
11. M. C. Miguel, J. S. Andrade Jr. and S. Zapperi, "Deblocking of Interacting Particle Assemblies: from Pinning to Jamming", Braz. J. Phys. 33, 557 (2003).
12. R. Dickman, M. A. Munoz, A. Vespignani and S. Zapperi, "Paths to Self-organized criticality" Braz. J. Phys. 30, 27 (2000)

Editorial material:

13. C.A.M. La Porta and S. Zapperi, "Biophysical processes in fibrosis", Physics of Life Reviews, 17 103 (2016).
14. S. Zapperi, "Looking at how things slip", Science 330, 184 (2010).
15. M.-C. Miguel and S. Zapperi, "Fluctuations in plasticity at the microscale", Science 312, 1151 (2006).
16. F. Sylos Labini and S. Zapperi, "Reverse age discrimination", Nature Physics 3, 582 (2007).

Journal papers:

Soft matter:

17. D. Rayneau-Kirkhope, S. Bonfanti, S. Zapperi, Density scaling in the mechanics of a disordered mechanical metamaterial, *Appl. Phys. Lett.* 114, 111992 (2019)
18. P. K. Jana, M. J. Alava, and Stefano Zapperi, Irreversible transition of amorphous and polycrystalline colloidal solids under cyclic deformation *Phys. Rev. E* 98, 062607 (2018).
19. A. Ghosh, Z. Budrikis, V. Chikkadi, A. L. Sellerio, S. Zapperi, and P. Schall, "Direct Observation of Percolation in the Yielding Transition of Colloidal Glasses". *Phys. Rev. Lett.* 118, 148001 (2017).
20. P. K. Jana, M. J. Alava and S. Zapperi, Irreversibility transition of colloidal polycrystals under cyclic deformation, *Scientific Reports* 7, Article number: 45550 (2017)
21. M. Ovaska, Z. Bertalan, A. Miksic, M. Sugni, C. Di Beedetto, C. Ferrario, L. Leggio, L. Guidetti, M. J. Alava, C. A.M. La Porta, S. Zapperi, "Deformation and fracture of echinoderm collagen networks", *Journal of the Mechanical Behavior of Biomedical Materials*, (2016)
22. C. Negri, A. L. Sellerio, S. Zapperi, M. C. Miguel, "Deformation and failure of curved colloidal crystal shells", *Proceedings of National Academy of Science (PNAS)* 112, 14545 (2015)
23. F. Leoni, A. Baldassarri, F. Dalton, A. Petri, G. Pontuale, S. Zapperi, "Friction memory in the stick-slip of a sheared granular bed", *Journal of Non-Crystalline Solids* 357 749–753 (2011).
24. A. Imperio, L. Reatto, and S. Zapperi, "Rheology of colloidal microphases in a model with competing interactions" *Phys. Rev. E* 78, 021402 (2008).
25. A. Petri, A. Baldassarri, F. Dalton, G. Pontuale, L. Pietronero, and S. Zapperi, "Stochastic dynamics of a sheared granular medium" *Eur. Phys. J. B* 64, 531 (2008).
26. A. Baldassarri, F. Dalton, A. Petri, S. Zapperi, G. Pontuale, and L. Pietronero, "Brownian Forces in Sheared Granular Matter" *Phys. Rev. Lett.* 96, 118002 (2006)
27. F. Lacombe, H. J. Herrmann and S. Zapperi, "Dilatancy and friction in granular media" *E. Phys. J. E* 2, 181 (2000).
28. Y. Grasselli, H. J. Herrmann, G. Oron and S. Zapperi, "Effect of impact energy on the shape of granular heaps", *Granular Matter* 2, 97 (2000).

Biological Physics:

29. S. Bonfanti, M. C. Lionetti, M. R. Fumagalli, V. R. Chirasani, G. Tiana, N. V. Dokholyan, S. Zapperi, C. A. M. La Porta, Molecular mechanisms of heterogeneous oligomerization of huntingtin proteins. *Scientific Reports* 9, Article number: 7615 (2019).
30. O. Chepizhko, M. C. Lionetti, C. Malinverno, C. Giampietro, G. Scita, S. Zapperi and C. A. M. La Porta. From jamming to collective cell migration through a boundary induced transition. *Soft matter*. 2018 May 1; 14:3774.
31. F. Font-Clos, S. Zapperi and C. A. M. La Porta Gene expression signature of obesity in monozygotic twins. *Physiol. Meas.* 2018 Apr 26; 39:044008.
32. F Font-Clos, S Zapperi, CAM La Porta Topography of epithelial–mesenchymal plasticity *Proceedings of the National Academy of Sciences* 115 (23), 5902-5907 (2018)
33. M. R. Fumagalli, S. Zapperi and C. A. M. La Porta Impact of the cross-talk between circular and messenger RNAs on cell regulation *J. Theor. Biol.* 2018 June 30; 454:386.
34. A Taloni, F Font-Clos, L Guidetti, S Milan, M Ascagni, C Vasco, ME Pasini, MR Gioria, E Ciusani, S Zapperi, CAM La Porta, "Probing spermiogenesis: a digital strategy for mouse acrosome classification" *Scientific Reports* 7 (1), 3748 (2017)
35. F Font-Clos, S Zapperi, CAM La Porta, "Integrative analysis of pathway deregulation in obesity" *NPJ Systems Biology and Applications* 3 (1), 18 (2017)
36. Z Bertalan, S Zapperi, CAM La Porta, "Modeling mechanical control of spindle orientation of intestinal

- crypt stem cells", *Journal of Theoretical Biology* 430, 103-108 (2017)
37. C. Giampietro, M. C. Lionetti, G. Costantini, F. Mutti, S. Zapperi and C. A. M. La Porta, "Cholesterol impairment contributes to neuroserpin aggregation". *Scientific Reports* 7, Article number: 43669 (2017).
 38. O. Chepizhko, C. Giampietro, E. Mastrapasqua, M. Nourazar, M. Ascagni, M. Sugni, U. Fascio, L. Leggio, C. Malinverno, G. Scita, S. Santucci, M. J. Alava, S. Zapperi, C.A.M. La Porta, "Bursts of activity in collective cell migration", *PNAS* 113, 11408 (2016).
 39. G. Costantini, Z. Budrikis, A. Taloni, A. K. Buell, S. Zapperi, and C. A. M. La Porta, "Fluctuations in protein aggregation: Design of preclinical screening for early diagnosis of neurodegenerative disease", *Phys. Rev. Applied* 6, 034012 (2016).
 40. A. L. Sellerio, E. Ciusani, N. Bossel Ben-Moshe, S. Coco, A. Piccinini, C. R. Myers, J. P. Sethna, C. Giampietro, S. Zapperi, C. A. M. La Porta "Overshoot during phenotypic switching of cancer cell populations" *Nature Scientific Report*, 5, 15464 (2015)
 41. Z. Bertalan, Z. Budrikis, C. A. M. La Porta, S. Zapperi, "Navigation Strategies of Motor Proteins on Decorated Tracks." *PLoS ONE* 10(8): e0136945 (2015)
 42. Z. Bertalan, Z. Budrikis, C. A. M. La Porta, S. Zapperi, "Role of the Number of Microtubules in Chromosome Segregation during Cell Division". *PLoS One*, 10, e0141305 (2015)
 43. A. Taloni, E. Kardash, O. U. Salman, L. Truskinovsky, S. Zapperi, and C. A. M. La Porta "Volume Changes During Active Shape Fluctuations in Cells" *Phys. Rev. Lett.* 114, 208101 (2015).
 44. C. A. M. La Porta, A. Ghilardi, M. E. Pasini, L. Laurson, Mikko J. Alava, S. Zapperi, M. Ben Amar, "Osmotic stress affects functional properties of human melanoma cell lines", *Eur. Phys. J. Plus* (2015).
 45. Z. Bertalan, C. A. M. La Porta, H. Maiato, S. Zapperi, Conformational mechanism for the stability of microtubule-kinetochore attachments. *Biophysical Journal*, 289–300 (2014).
 46. Z. Budrikis, G. Costantini, C. A. M. La Porta, S. Zapperi, "Protein accumulation in the endoplasmic reticulum as a non-equilibrium phase transition" *Nature Comm.* 5, 3620 (2014).
 47. A. Taloni, A. A. Alemi, J. P. Sethna, S. Zapperi, C. A. M. La Porta "Mechanical Properties of Growing Melanocytic Nevi and the Progression to Melanoma". *PLoS ONE* 9(4), e94229 (2014).
 48. M. M. Baraldi, A. A. Alemi, J. P. Sethna, S. Caracciolo, C. A. M. La Porta and S. Zapperi, "Growth and form of melanoma cell colonies", *J. Stat. Mech.* (2013) P02032
 49. S. Zapperi and C. A. M. La Porta, "Do cancer cells undergo phenotypic switching? The case for imperfect cancer stem cell markers", *Scientific Reports* 2, 441 (2012)
 50. C. A. M. La Porta, S. Zapperi, J. P. Sethna "Senescence cells in growing tumors: population dynamics in cancer stem cells." *Plos Computational Biology* e1002316 (2012).
 51. S. Zapperi and L. Mahadevan, "Dynamic Instability of a Growing Adsorbed Polymorphic Filament", *Biophys. J.* 101, 267 (2011)
 52. A. M. Alencar, Z. Hantos, F. Petak, J. Tolnai, T. Asztalos, S. Zapperi, J. S. Andrade, H. E. Stanley and B. Suki, "Scaling Behavior in Crackle Sound during Lung Inflation", *Phys. Rev. E* 60, 4659 (1999).
 53. J. S. Andrade Jr., A. M. Alencar, M. P. Almeida, J. Mendes Filho, S. V. Buldyrev, S. Zapperi, H. E. Stanley and B. Suki "Asymmetric Flow in Symmetric Branched Structures", *Phys. Rev. Lett.* 81, 926 (1998)
 54. B. Suki, J. Andrade, M. Coughlin, D. Stamenovic, H. E. Stanley, M. Sujeer and S. Zapperi, "Mathematical Modeling of the First Inflation of Degassed Lungs", *Ann. Biomed. Eng.* 26, 608 (1998).
 55. B. Suki, A. M. Alencar, M. K. Sujeer, K. R. Lutchen, J. J. Collins, J. S. Andrade, Jr., E. P. Ingenito, S. Zapperi, H. E. Stanley, "Life support system benefits from noise", *Nature* 393, 127 (1998).
 56. M. K. Sujeer, S. Zapperi, S. V. Buldyrev, H. E. Stanley and B. Suki "Volume Distributions of Avalanches in Lung Inflation: a statistical mechanical approach", *Phys. Rev. E* 56, 3385 (1997).

Graphene:

57. Y. Zhang, M. Heiranian, B. Janicek, Z. Budrikis, S. Zapperi, P. Y. Huang, H. T. Johnson, N. R. Aluru, J. W. Lyding, and N. Mason, "Strain Modulation of Graphene by Nanoscale Substrate Curvatures: A Molecular View" *Nano Letters* 18, 2098 (2018)
58. Z. Budrikis, S. Zapperi, "Temperature-Dependent Adhesion of Graphene Suspended on a Trench" *Nano Letters* Article 16, 387 (2016).
59. A. L. Sellerio, A. Taloni, and S. Zapperi, "Fracture Size Effects in Nanoscale Materials: The Case of

Graphene" Phys. Rev. Applied 4, 024011 (2015).

60. Z. Budrikis, A. L. Sellerio, Z. Bertalan, S. Zapperi. "Wrinkle motifs in thin films". Scientific Reports 5, 8938 (2015).

Fracture:

61. S. Bonfanti, E. E. Ferrero, A. L. Sellerio, R. Guerra, S. Zapperi S. Damage Accumulation in Silica Glass Nanofibers Nano Lett. 2018 Jul 11; 18:4100.
62. Z. Bertalan, A. Shekhawat, J. P. Sethna, and Stefano Zapperi, "Fracture Strength: Stress Concentration, Extreme Value Statistics, and the Fate of the Weibull Distribution" Phys. Rev. Applied 2, 034008 (2014)
63. C. Manzato, M. J. Alava, S. Zapperi, "Damage accumulation in quasibrittle fracture" Phys. Rev. E 90, 012408 (2014).
64. P. Barai, P. K. V. V. Nukala, M. J. Alava, S. Zapperi, "Role of the sample thickness in planar crack propagation" Phys. Rev. E 88, 042411 (2013).
65. A. Shekhawat, S. Zapperi, and J. P. Sethna, "From Damage Percolation to Crack Nucleation Through Finite Size Criticality", Phys. Rev. Lett. 110, 185505 (2013).
66. S. Lennartz-Sassinek, I. G. Main, M. Zaiser, C. Manzato, S. Zapperi, "Emergent patterns of localized damage as a precursor to catastrophic failure in a random fuse network", Phys. Rev. E 87, 042811 (2013).
67. C. Manzato, A. Shekhawat, P. K. V. V. Nukala, M. J. Alava, J. P. Sethna, and S. Zapperi, "Fracture Strength of Disordered Media: Universality, Interactions, and Tail Asymptotics", Phys. Rev. Lett. 108, 065504 (2012).
68. L. Laurson and S. Zapperi, "Roughness and multiscaling of planar crack fronts", JSTAT P11014 (2011)
69. C. B. Picallo, J. M. Lopez, S. Zapperi, M. J. Alava, "From brittle to ductile fracture in disordered materials" Phys. Rev. Lett. 105, 155502 (2010).
70. P. K. V. V. Nukala, P. Barai, S. Zapperi, M. J. Alava, and S. Šimunović, "Fracture roughness in three-dimensional beam lattice systems" Phys. Rev. E 82, 026103 (2010).
71. L. Laurson, S. Santucci, and S. Zapperi, "Avalanches and clusters in planar crack front propagation" Phys. Rev. E 81, 046116 (2010).
72. P. K. V. V. Nukala, S. Zapperi, M. J. Alava and S. Simunovic, "Anomalous roughness of fracture surfaces in 2D fuse models" Int. J. Fracture 154, 119 (2008).
73. M. J. Alava, P. K. V. V. Nukala and S. Zapperi, "Fracture size effects from disordered lattice models", Int. J. Fracture 154, 51 (2008).
74. P. K. V. V. Nukala, S. Zapperi, M. J. Alava and S. Simunovic, "Crack roughness in the two-dimensional random threshold beam model" Phys. Rev. E 78, 046105 (2008).
75. M. J. Alava, P. K. V. V. Nukala and S. Zapperi, "Role of disorder in the size scaling of materials strength", Phys. Rev. Lett. 100, 055502 (2008)
76. R. Cruz Hidalgo, S. Zapperi and H. J. Herrmann, "Discrete fracture model with anisotropic load sharing", J. Stat. Mech. (2008) P01004
77. P. K. V. V. Nukala, S. Zapperi, M. J. Alava and S. Simunovic, "Effect of disorder and notches on crack roughness", Phys. Rev. E 76, 056111 (2007).
78. F. Kun, M. H. Costa, R. N. Costa Filho, J. S. Andrade Jr, J. B. Soares, S. Zapperi and H. J. Herrmann, "Fatigue failure of disordered materials" J. Stat. Mech. P02003 (2007)
79. P. K. V. V. Nukala, S. Simunovic and S. Zapperi, "Crack surface roughness in three-dimensional random fuse networks", Phys. Rev. E 74, 026105 (2006).
80. M. J. Alava, P. K. V. V. Nukala and S. Zapperi, "Morphology of two dimensional fracture surfaces", J. Stat. Mech. (2006) L10002
81. S. Zapperi and P. K. V. V. Nukala, "Fracture statistics in the three-dimensional random fuse model", Int. J. Fracture 140, 99 (2006).
82. S. Zapperi, P. K. V. V. Nukala and S. Simunovic, "Crack avalanches in the three dimensional random fuse model" Physica A 357, 129 (2005).
83. P. K. V. V. Nukala, S. Zapperi and S. Simunovic, "Statistical properties of fracture in a random spring model" Phys. Rev. E 71, 066106 (2005).
84. S. Zapperi, P. Nukala and S. Simunovic, "Crack roughness and avalanche precursors in the random fuse model" Phys. Rev. E 71, 026106 (2005)

85. P. K. V. V. Nukala, S. Simunovic and S. Zapperi, "Percolation and localization in the random fuse model" *J. Stat. Mech.* (2004) P08001
86. M. J. Alava and S. Zapperi, "Comment on Roughness of Interfacial Crack Fronts: Stress-Weighted Percolation in the Damage Zone" *Phys. Rev. Lett.* 92 049601 (2004).
87. M. Minozzi, G. Caldarelli, L. Pietronero and S. Zapperi, "Dynamic fracture model for acoustic emission" *Eur. Phys. J. B* 36, 203 (2003).
88. F. Kun, S. Zapperi and H. J. Herrmann, "Damage in fiber bundles" *E. Phys. J. B* 17, 269 (2000).
89. S. Zapperi, H. J. Herrmann and S. Roux "Planar cracks in the fuse model" *E. Phys. J. B* 17, 131 (2000).
90. S. Zapperi, P. Ray, H. E. Stanley and A. Vespignani, "Avalanches in fracture and breakdown processes" *Phys. Rev. E* 59, 5049 (1999).
91. S. Zapperi, A. Vespignani and H. E. Stanley, "Plasticity and avalanche behaviour in microfracturing phenomena", *Nature* 388, 658 (1997).
92. S. Zapperi, P. Ray, H. E. Stanley and A. Vespignani, "First-Order Transition in the Breakdown of Disordered Media", *Phys. Rev. Lett.* 78, 1408 (1997).

Plasticity:

93. M. Ovaska, A. Lehtinen, M. J. Alava, L. Laurson, and S. Zapperi, "Excitation Spectra in Crystal Plasticity", *Phys. Rev. Lett.* 119, 265501 (2017)
94. Z Budrikis, DF Castellanos, S Sandfeld, M Zaiser, S Zapperi, "Universal features of amorphous plasticity" *Nature Communications* 8, ncomms15928 (2017)
95. A. Lehtinen, Gi. Costantini, M. J. Alava, S. Zapperi, and L. Laurson, "Glassy features of crystal plasticity", *Phys. Rev. B* 94, 064101 (2016)
96. P. D. Ispánovity, L. Laurson, M. Zaiser, I. Groma, S. Zapperi, and M. J. Alava, "Avalanches in 2D Dislocation Systems: Plastic Yielding Is Not Depinning" *Phys. Rev. Lett.* 112, 235501 (2014)
97. F. Leoni and S. Zapperi, "Dislocation mutual interactions mediated by mobile impurities and the conditions for plastic instabilities" *Phys. Rev. E* 89, 022403 (2014)
98. Z. Budrikis, S. Zapperi, "Avalanche localization and crossover scaling in amorphous plasticity". *Phys. Rev. E* 88, 062403 (2013).
99. Z. Budrikis, S. Zapperi, "Size effects in dislocation depinning models for plastic yield", *JSTAT* (2013) P04029.
100. S. Papanikolaou, D. M. Dimiduk, W. Choi, J. P. Sethna, M. D. Uchic, C. F. Woodward, and S. Zapperi, "Quasi-periodic events in crystal plasticity and the self-organized avalanche oscillator" *Nature* 490, 517-521 (2012). Featured on the cover of the journal.
101. C. B. Picallo, J. M. Lopez, S. Zapperi and M. J. Alava, "Optimization and Plasticity in Disordered Media" *Phys. Rev. Lett.* 103, 225502 (2009)
102. F. Leoni and S. Zapperi, "Slip line growth as a critical phenomenon", *Phys. Rev. Lett.* 102, 115502 (2009)
103. F. Leoni and S. Zapperi, "Grain Boundary diffusion in a Peierls potential" *J. Stat. Mech.* (2007) P12004
104. F. Csikor, C. Motz, D. Weygand, M. Zaiser and S. Zapperi, Dislocation Avalanches, Strain Bursts, and the Problem of Plastic Forming at the Micrometer Scale, *Science* 318, 251 (2007).
105. M.-C. Miguel, P. Moretti, M. Zaiser, and S. Zapperi, "Statistical dynamics of dislocations in simple models of plastic deformation: Phase transitions and related phenomena" *Mat. Sci. and Eng. A* 400-401,191 (2005)
106. V. Beato, L. Pietronero and S. Zapperi "Statistical properties of dislocation mutual interactions" *J. Stat. Mech.* (2005) P04011
107. P. Moretti, M.-C. Miguel, M. Zaiser, and S. Zapperi, "Depinning transition of dislocation assemblies: Pileups and low-angle grain boundaries" *Phys. Rev. B* 69, 214103 (2004).
108. M. C. Miguel, A. Vespignani, M. Zaiser and S. Zapperi, "Dislocation jamming and Andrade creep" *Phys. Rev. Lett.* 89, 165501 (2002)
109. M. C. Miguel, A. Vespignani, S. Zapperi, J. Weiss and J. R. Grasso, "Complexity in dislocation dynamics: model" *Mat. Sci. and Eng. A* 309-310, 324 (2001).
110. J. Weiss, J. R. Grasso, M. C. Miguel, A. Vespignani and S. Zapperi, "Complexity in dislocation dynamics: experiments" *Mat. Sci. and Eng. A* 309-310, 321 (2001).

111. S. Zapperi and M. Zaiser, "Depinning of a dislocation: effect of long range interactions", *Mat. Sci. and Eng. A* 309-310, 348 (2001).
112. M. C. Miguel, A. Vespignani, S. Zapperi, J. Weiss and J. R. Grasso, "Intermittent dislocation flow in viscoplastic deformation", *Nature* 410, 667 (2001).

Friction:

113. S Bonfanti, A Taloni, C Negri, A Sellerio, N Manini, S Zapperi "Atomic scale front propagation at the onset of frictional sliding", *The Journal of Physical Chemistry Letters* 8, 5438 (2017)
114. A. Taloni, A. Benassi and S. Zapperi, "Scalar model for the frictional precursors dynamics", *Sci. Rep.* 5, 8086 (2015)
115. R. Capozza, A. Vanossi, A. Vezzani and S. Zapperi, "Triggering Frictional Slip by Mechanical Vibrations", *Tribol. Lett.* 48 95 (2012).
116. M. Reguzzoni, M. Ferrario, S. Zapperi and M. C. Righi, "Onset of frictional slip in an adsorbed monolayer", *PNAS* 107, 1311 (2010).
117. R. Capozza, A. Vanossi, A. Vezzani and S. Zapperi, "Suppression of friction by mechanical vibration", *Phys. Rev. Lett.* 103, 085502 (2009).
118. F. Lacombe, S. Zapperi and H. J. Herrmann, "Force fluctuation in a driven elastic chain" *Phys. Rev. B* 63, 104104 (2001).

Ferromagnetic hysteresis and Barkhausen effect:

119. L. Laurson, G. Durin, and S. Zapperi, "Universality classes and crossover scaling of Barkhausen noise in thin films" *Phys. Rev. B* 89, 104402 (2014)
120. Y.-J. Chen, S. Papanikolaou, J. P. Sethna, S. Zapperi, and G. Durin, "Avalanche spatial structure and multivariable scaling functions: Sizes, heights, widths, and views through windows" *Phys. Rev. E* 84, 061103 (2011).
121. A. Benassi and S. Zapperi, "Barkhausen instabilities from labyrinthine magnetic domains", *Phys. Rev. B* 84, 214441 (2011).
122. L. Laurson, C. Serpico, G. Durin, S. Zapperi, "Thermally activated domain wall dynamics in a disordered magnetic nanostrip", *J. Appl. Phys.* 109, 07D345 (2011).
123. S. Papanikolaou, F. Bohn, R. L. Sommer, G. Durin, S. Zapperi, J. P. Sethna, "Universality beyond power laws and the average avalanche shape", *Nature Physics* 7, 316 (2011).
124. L. Laurson, C. Serpico, G. Durin and S. Zapperi, "Thermally activated domain wall dynamics in a disordered magnetic nanostrip", *J. Appl. Phys.* 109, 07D345 (2011).
125. L. Laurson, A. Mughal, G. Durin and S. Zapperi, "Modeling Domain Wall Dynamics in Thin Magnetic Strips With Disorder", *IEEE Trans Magn.*, 46, 262 (2010).
126. A. Mughal, L. Laurson, G. Durin and S. Zapperi, "Effect of Dipolar Interactions for Domain-Wall Dynamics in Magnetic Thin Films", *IEEE Trans Magn.*, 46, 262 (2010).
127. B. Cerruti, G. Durin, and S. Zapperi, "Hysteresis and noise in ferromagnetic materials with parallel domain walls", *Phys. Rev. B*, 79 134429 (2009).
128. A. Magni, G. Durin, J. P. Sethna and S. Zapperi, "Visualization of avalanches in magnetic thin films: temporal processing", *J. Stat. Mech.* (2009) P01020
129. B. Cerruti, G. Durin and S. Zapperi, "Dipolar interactions in ferromagnetic systems: Dynamic hysteresis from parallel domain walls", *Physica B* 403, 422 (2008).
130. F. Colaïori, G. Durin and S. Zapperi, "Eddy current damping of a moving domain wall: beyond the quasistatic approximation", *Phys. Rev. B* 76, 224416 (2007).
131. G. Durin and S. Zapperi, "Loss separation for dynamic hysteresis in magnetic thin films", *J. Magn. Magn. Mat.* 316, E549 (2007).
132. G. Durin, F. Colaïori, C. Castellano and S. Zapperi, "Signature of negative mass in soft magnetic materials", *J. Magn. Magn. Mat.* 316, 436 (2007).
133. B. Cerruti and S. Zapperi, "Dynamic hysteresis from zigzag domain walls", *Phys. Rev. B* 75, 064416 (2007)
134. F. Colaïori, G. Durin and S. Zapperi, "Loss separation for dynamic hysteresis in ferromagnetic thin

- films", Phys. Rev. Lett. 97, 2527203 (2006).
135. L. Santi, F. Bohn, A.D.C. Viegas, G. Durin, A. Magni, R. Bonin, S. Zapperi and R.L. Sommer, "Effects of thickness on the statistical properties of the Barkhausen noise in amorphous films", Physica B 384, 144 (2006).
 136. B. Cerruti and S. Zapperi, "Barkhausen noise from zigzag domain walls", J. Stat. Mech. (2006) P08020.
 137. G. Durin and S. Zapperi, "The role of stationarity in magnetic crackling noise" J. Stat. Mech. (2006) P01002.
 138. S. Zapperi, C. Castellano, F. Colaiori and G. Durin, "Signature of effective mass in crackling noise asymmetry" Nature Phys. 1, 46 (2005).
 139. M. J. Alava, V. Basso, F. Colaiori, L. Dante, G. Durin, A. Magni, and S. Zapperi, "Ground-state optimization and hysteretic demagnetization: the random-field Ising model", Phys. Rev. B 71, 64423 (2005)
 140. S. Zapperi, F. Colaiori, L. Dante, V. Basso, G. Durin, A. Magni and M. J. Alava, "Is demagnetization an efficient optimization method?", J. Magn. Magn. Mat 272-276, E1009 (2004)
 141. L. Santi, L. S. Dorneles, R. L. Sommer, F. Colaiori, S. Zapperi, A. Magni and G. Durin, "Investigation of scaling properties of hysteresis in Finemet thin films", J. Magn. Magn. Mat 272-276, E913 (2004)
 142. F. Colaiori, S. Zapperi and G. Durin, "Shape of a Barkhausen pulse" J. Magn. Magn. Mat 272-276, E533 (2004)
 143. F. Colaiori, M. J. Alava, G. Durin, A. Magni, and S. Zapperi, "Phase Transitions in a Disordered System in and out of Equilibrium" Phys. Rev. Lett. 92, 257203 (2004)
 144. R. A. da Silveira and S. Zapperi, "Critical hysteresis from random anisotropy" Phys. Rev. B 69, 212404 (2004)
 145. L. Santi, R. L. Sommer, A. Magni, G. Durin, F. Colaiori, and S. Zapperi, "Dynamic Hysteresis in Finemet Thin Films" IEEE Trans. on Magn. 39, 2666 (2003).
 146. G. Durin and S. Zapperi, "Complex dynamics of magnetic domain walls", Physica A 314, 230 (2002).
 147. F. Colaiori, A. Gabrielli and S. Zapperi, "Rayleigh loops in the random-field Ising model on the Bethe lattice" Phys. Rev. B 65, 224404 (2002).
 148. G. Durin and S. Zapperi, "On the power spectrum of magnetization noise" J. Magn. Magn. Mat. 242-245P2,1085 (2002).
 149. S. Zapperi, G. Durin and A. Magni, "Microscopic foundations of the Rayleigh law of hysteresis" J. Magn. Magn. Mat. 242-245P2, 987 (2002).
 150. L. Dante, G. Durin, A. Magni, and S. Zapperi, "Low-field hysteresis in disordered ferromagnets" Phys. Rev. B 65, 144441 (2002)
 151. G. Durin and S. Zapperi, "Universality and size effects in the Barkhausen noise", J. Appl. Phys. 87, 7031 (2000).
 152. G. Durin and S. Zapperi, "Scaling exponents for Barkhausen avalanches in polycrystalline and amorphous ferromagnets" Phys. Rev. Lett. 84, 4705 (2000).
 153. G. Durin and S. Zapperi, "Barkhausen noise in soft amorphous magnetic materials under applied stress", J. Appl. Phys. 85, 5196 (1999).
 154. S. Zapperi, P. Cizeau, G. Durin and H. E. Stanley "Dynamics of a ferromagnetic domain wall: avalanches, depinning transition and the Barkhausen effect", Phys. Rev. B 58, 6563 (1998).
 155. P. Cizeau, S. Zapperi, G. Durin and H. E. Stanley "Dynamics of a ferromagnetic domain wall and the Barkhausen effect", Phys. Rev. Lett. 79, 4669 (1997).

Metal insulator transition:

156. A. Shekhawat, S. Papanikolaou, S. Zapperi and J. P. Sethna, "Dielectric Breakdown and Avalanches at Nonequilibrium Metal-Insulator Transitions", Phys. Rev. Lett. 107, 276401 (2011).

Vortex matter in type II superconductors:

157. M.-C. Miguel, A. M. Mughal and S. Zapperi, "Laminar Flow of a Sheared Vortex Crystal: Scars in Flat

- Geometry", Phys. Rev. Lett. 106, 245501 (2011).
158. P. Moretti, M.-C. Miguel, and S. Zapperi "Grain boundaries in vortex matter" Phys. Rev. B 72, 014505 (2005)
159. S. Zapperi, J. S. Andrade Jr. and A. A. Moreira, "Vortex nucleation and flux front propagation in type II superconductors" Physica A 342, 383 (2004).
160. P. Moretti, M.-C. Miguel, M. Zaiser, and S. Zapperi, "Growth of a Vortex Polycrystal in Type II Superconductors" Phys. Rev. Lett. 92, 257004 (2004)
161. M. C. Miguel and S. Zapperi, "Tearing transition and plastic flow in superconducting thin films", Nature Mat. 2, 477 (2003).
162. A. A. Moreira, J. S. Andrade Jr., Mendes Filho J. and S. Zapperi "Boundary effects on flux penetration in disordered superconductors" Phys. Rev. B 66, 174507 (2002).
163. S. Zapperi, A. A. Moreira and J. S. Andrade Jr., "Flux front penetration in disordered superconductors" Phys. Rev. Lett. 86, 3622 (2001).
164. S. Zapperi, J. S. Andrade and J. Mendes Filho, "Depinning of interacting particles in random media" Phys. Rev. B 61, 14791 (2000).

Non-equilibrium statistical mechanics:

165. Y. J. Chen, S. Zapperi, and J. P. Sethna Crossover behavior in interface depinning. Phys. Rev. E 92, 022146 (2015)
166. M. J. Alava, L. Laurson, A. Vespignani, and S. Zapperi, "Comment on Self-organized criticality and absorbing states: lessons from the Ising model" Phys. Rev. E 77, 048101 (2008)
167. L. Laurson, M. J. Alava and S. Zapperi, "Power spectra of self-organized critical sandpiles" J. Stat. Mech. (2005) L11001
168. Dickman, M. Alava, M. A. Munoz, J. Peltola, A. Vespignani, and S. Zapperi, "Critical behavior of a one-dimensional fixed-energy stochastic sandpile" Phys. Rev. E 64, 056104 (2001)
169. A. Vespignani, R. Dickman, M. A. Munoz, and S. Zapperi, "Absorbing-state phase transitions in fixed-energy sandpiles" Phys. Rev. E 62, 4564(2000).
170. A. Barrat, A. Vespignani and S. Zapperi, "Fluctuations and correlations in sandpile models", Phys. Rev. Lett. 83, 1962 (1999).
171. E. V. Ivashkevich, A. M. Povolotsky, A. Vespignani and S. Zapperi, "Dynamically Driven Renormalization Group Applied to Sandpile Models", Phys. Rev. E 60, 1239 (1999).
172. M. A. Munoz, R. Dickman, A. Vespignani and S. Zapperi, "Avalanche and spreading exponents in systems with absorbing states", Phys. Rev. E 59, 6175 (1999).
173. A. Chessa, H. E. Stanley, A. Vespignani and S. Zapperi, "Universality in sandpiles", Phys. Rev. E 59, R12 (1999).
174. A. Vespignani, R. Dickman, M. A. Munoz and S. Zapperi, "Driving, conservation and absorbing states in sandpiles" Phys. Rev. Lett. 81, 5676 (1998).
175. A. Vespignani and S. Zapperi, "How self-organized criticality works: a unified mean-field theory" Phys. Rev. E 57, 6345 (1998).
176. A. Chessa, E. Marinari, A. Vespignani and S. Zapperi, "Mean-field behavior of the sandpile model below the upper critical dimension", Phys. Rev. E 57, R6241 (1998).
177. R. Dickman, A. Vespignani and S. Zapperi, "Self-organized criticality as an absorbing-state phase transition" Phys. Rev. E 57, 5095 (1998).
178. R. Cafiero, A. Vespignani, S. Zapperi and L. Pietronero, "Universality and scale invariant dynamics in laplacian fractal growth", Int. J. Mod. Phys. B 11, 3595 (1997).
179. A. Vespignani, S. Zapperi and V. Loreto, "Dynamically Driven Renormalization Group", J. of Stat. Phys. 88, 47 (1997).
180. A. Vespignani and S. Zapperi, "Order Parameter and Scaling Fields for Self-Organized Criticality" Phys. Rev. Lett. 78, 4793 (1997).
181. V. Loreto, L. Pietronero, A. Vespignani and S. Zapperi, "Reply to the comment on Renormalization Group approach to the critical behavior of the Forest Fire Model" Phys. Rev. Lett. 78, 1393 (1997).
182. A. Vespignani, S. Zapperi and V. Loreto, "Renormalization of non-equilibrium systems with critical

- stationary states", Phys. Rev. Lett. 77, 4560 (1996).
183. K. B. Lauritsen, S. Zapperi and H. E. Stanley, "Self-Organized Branching Process with dissipation", Phys. Rev. E 54 2483 (1996).
184. V. Loreto, A. Vespignani and S. Zapperi "Renormalization scheme for the Forest Fire Model", J. of Phys. A 29, 2981 (1996).
185. B. Kutnjak-Urbanc, S. Zapperi, S. Milosevic and H.E. Stanley, "Sandpile model on sierpinski gasket fractal", Phys. Rev. E 54, 272 (1996).
186. S. Zapperi, K. B. Lauritsen and H. E. Stanley, "Self Organized Branching Processes: a Mean-Field Theory for Avalanches", Phys. Rev. Lett. 75, 4071 (1995).
187. V. Loreto, L. Pietronero, A. Vespignani and S. Zapperi "Renormalization Group approach to the critical behavior of the Forest Fire Model", Phys. Rev. Lett. 75, 465 (1995).
188. R. Cafiero, V. Loreto, L. Pietronero, A. Vespignani and S. Zapperi, "Local rigidity and self-organized criticality for avalanches", Europhys. Lett. 29, 111 (1995).
189. A. Vespignani, S. Zapperi and L. Pietronero, "Renormalization approach to the self-organized critical behavior of sandpile models", Phys. Rev. E 51,1711 (1995).
190. L. Pietronero, A. Vespignani and S. Zapperi, "Renormalization scheme for self-organized criticality in sandpile models", Phys. Rev. Lett. 72, 1690 (1994).

Conference proceedings:

191. V. Beato, M. Zaiser and S. Zapperi, The Connection between Size Effects and Strain Bursts in Microscale Plasticity, AIP Conference Proceedings, 1168, 1127 (2009).
192. G. Durin and S. Zapperi, "Two dimensional models for Barkhausen noise", Proceedings of SPIE - The International Society for Optical Engineering 5843 pp. 31-39 (2005).
193. G. Durin, C. Castellano, F. Colaiori and S. Zapperi, "Time asymmetry of magnetic noise", Proceedings of SPIE - The International Society for Optical Engineering 5469 pp. 4-12 (2004).
194. L. Santi, A. Magni, G. Durin, R. L. Sommer, F. Colaiori and S. Zapperi, "Dynamic hysteresis in Finemet thin films" Digest of INTERMAG 2003. International Magnetism Conference, AA-08 (2003).
195. G. Durin, F. Colaiori, S. Zapperi "Universality and scaling in the Barkhausen noise", in SPIE Proceedings 5112, 35, "Fluctuations and Noise 2003: Noise as a Tool for Studying Materials". Eds. M. B. Weissman, N. E. Israeloff, A. S. Kogan (2003).
196. M.-C. Miguel and S. Zapperi, "The Plastic Phase of Driven Vortex Crystals.", in Proceedings of the 7th Granada Seminar on Computational Physics, Eds. J. Marro and P. L. Garrido, AIP Conf. Proc. 661(1) 163 (2003).
197. S. Zapperi, H. J. Herrmann and S. Roux "Planar cracks in the fuse model", in Scaling and Disordered Systems: International Workshop and Collection of Articles Honoring Professor Antonio Coniglio on the Occasion of his 60th Birthday (Edited by Fereydoon Family, Mohamed Daoud, Hans J. Herrmann, H. Eugene Stanley), Fractals 11, 327, Suppl. S (2003).
198. M. A. Munoz, R. Dickman, R. Pastor-Satorras, A. Vespignani, S. Zapperi, "Sandpiles and absorbing-state phase transitions: recent results and open problems", Proceedings of the 6th Granada Seminar on Computational Physics, Eds. J. Marro and P. L. Garrido, American Institute of Physics, vol. 574, 102 (2001)
199. S. Zapperi and M. Zaiser, "Critical Behavior of a Depinning Dislocation" Mat. Res. Soc. Proc. 672, Y7.2 (2001).
200. M. C. Miguel, A. Vespignani, S. Zapperi, "MODELING COLLECTIVE DISLOCATION DYNAMICS IN ICE SINGLE CRYSTALS " Mat. Res. Soc. Proc. 578, A6.4 (1999)
201. S. Zapperi, P. Ray, H. E. Stanley and A. Vespignani, "Analysis of damage clusters in fracture processes" Physica A 270, 57 (1999).
202. A. Chessa, A. Vespignani, S. Zapperi, "Critical exponents in stochastic sandpile models", Comp. Phys. Comm. 121-122, 299 (2000); Proceeding of CCP98, Grenada, Spain.
203. S. Zapperi and G. Durin, "New perspectives for the Barkhausen effect", Proceeding of the VIII workshop on computational material science, S. Margherita di Pula, Italy (1998). Comp. Mat. Sci. 20, 436 (2001).
204. A. Vespignani, S. Zapperi and V. Loreto, "Dynamically driven renormalization group applied to self-organized critical systems", Int. J. Mod. Phys. B 12, 1407 (1998). selected papers of the third International

- conference "Renormalization Group 96" eds. D.V. Shirkov, D.I. Kazakov and V.B. Priezzhev.
205. Suki, B., A. Alencar, S. Zapperi, H.E. Stanley, F.Petak, J. Tolnai, T. Asztalos, and Z. Hantos, "Heterogeneity and complexity in the statistical properties of crackle sound propagation in the lung." International Conference of the American Thoracic Society, May 1998, Chicago, Am. J. Respir. And Critical Care Med. 157, 3, A82 (1998).
 206. G. Durin, S. Zapperi, P. Cizeau and H. E. Stanley "New elements for a theory of the Barkhausen noise", J. Phys. IV 8, 319 (1998).
 207. S. Zapperi, P. Ray, H. E. Stanley and A. Vespignani, "Scaling for the Coalescence of Microfractures before Breakdown" Mat. Res. Soc. Proc. 463, 215 (1997).
 208. S. Zapperi, A. Vespignani and H. E. Stanley, "Modeling Acoustic Emission in Microfracturing Processes" Mat. Res. Soc. Proc. 409, 355 (1996).
 209. V. Loreto, L. Pietronero, A. Vespignani and S. Zapperi "Renormalization Group Approach for Forest Fire Models" Fractals 3, 445 (1995).
 210. S. Zapperi, A. Vespignani and L. Pietronero, "Real Space Renormalization Group for Self-Organized Criticality in Sandpile Models" Mat. Res. Soc. Proc. 367, 67 (1995).