

Ezequiel Ferrero

Physics PhD

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Personal details

Full Name Eduardo Ezequiel Ferrero
Profession Physicist
Date of birth February 6th 1981
Place of birth Córdoba, Argentina
Citizenship Argentinian & Italian
Personal Married, father of one child (paternal leave 2017)

Career

Jan 2018 -... **Permanent Researcher**, *Condensed Matter Theory group, Centro Atómico Bariloche, Argentina, Adjunct Researcher CONICET (Argentinean National Research Council).*

Jan 2017 -Dec 2017 **Postdoc in Physics (contract)**, *Dipartimento di Fisica, Università degli Studi di Milano, Italia.*
Topic Glasses and disordered metamaterials
Supervisor Dr. Stefano Zapperi

May 2013 -Dec 2016 **Postdoc in Physics (contract)**, *Laboratoire Interdisciplinaire de Physique, Université Grenoble Alpes, Grenoble, France.*
Topic Amorphous solids
Supervisor Dr. Jean-Louis Barrat

Aug-Nov 2012 **Postdoc in Physics (sandwich fellowship)**, *LPTMS, Université Paris Sud, Orsay, France.*
Topic Driven elastic interfaces in random media
Supervisor Dr. Alberto Rosso

Apr 2011 -Apr 2013 **Postdoc in Physics (fellowship)**, *Solid State Theory group, Centro Atómico Bariloche, Argentina.*
Topic Disordered Elastic Systems
Supervisors Dr. Alejandro B. Kolton, Dr. Sebastián Bustingorry

Mar 2011 **Ph.D. in Physics (“Doctor en Física”)**, *Universidad Nacional de Córdoba, Argentina.*
— PHD THESIS
Title "Relaxational dynamics of the q-state bidimensional Potts model: a contribution to the description of first order phase transitions non-equilibrium properties".
Advisor Prof. Dr. Sergio A. Cannas

Dec 2005 **MS degree in Physics (“Licenciado en Física”)**, *Universidad Nacional de Córdoba, Argentina.*
— MS. THESIS
Title “Metastability in the q-state Potts model”
Advisor Prof. Dr. Sergio A. Cannas

Scientific stays

- Sep-Oct 2019 **LIPhy, Université Grenoble Alpes, Grenoble, France**, CNRS Invited Researcher, Two months stay.
- Oct-Nov 2014 **KITP, University of California, Santa Barbara, USA**, Avalanches, Intermittency, and Nonlinear Response in Far-From-Equilibrium Solids, Three working weeks.
- Aug-Nov 2012 **LPTMS, Université Paris Sud, Orsay, France**, Collaboration with Dr. Alberto Rosso, Four months stay.
- Topic Avalanches triggered by thermal activation in driven elastic lines on disorder media

Fellowships/Scholarships/Awards

- 2015 **Best Poster Award**, *Programming and Tuning Massively Parallel Systems summer school (PUMPS)*, Barcelona, Spain.
- 2013 **Special Mention**, *in the frame of Juan José Giambiagi Prize 2013 to the best PhD Thesis in Physics defended in the country*, Argentinean Physics Society, Argentina.
- 2012 **Postdoctoral Fellowship**, *Bernardo Houssay Program*, MESR (France) - MINCYT (Argentina), Université Paris Sud, Orsay, France.
- 2011-2013 **Postdoctoral Fellowship**, *CONICET, CAB, Bariloche*, Argentina.
- 2009-2011 **Postgraduate Fellowship Type 2**, *CONICET, UNC*, Argentina.
- 2006-2009 **Postgraduate Fellowship Type 1**, *CONICET, UNC*, Argentina.
- 2005 **Graduate Thesis Scholarship**, *Córdoba's Governmental Science Agency, UNC*, Argentina, ConCiencias Program.
- 2004 **Exchange Scholarship**, *AUGM (Montevideo Universities Association)*, UFPR (Universidade Federal do Paraná), Brazil, ESCALA Program.

Publications

Preprints

2. *"The yielding of amorphous solids at finite temperatures"*.
E.E. Ferrero, A.B. Kolton, E.A. Jagla
arXiv:2107.06365
1. *"The Fate of Shear-Oscillated Amorphous Solids"*.
C. Liu, E.E. Ferrero, E.A. Jagla, K. Martens, A. Rosso, L. Talon.
arXiv:2012.15310

Published research articles

24. *"Universal Critical Exponents of the Magnetic Domain Wall Depinning Transition"*.
L.J. Albornoz, E.E. Ferrero, A.B. Kolton, V. Jeudy, S. Bustingorry, J. Curiale
Accepted for publication in Phys. Rev. B as "Letter" (13 July 2021) arXiv:2101.06555
23. *"Creep motion of elastic interfaces driven on disorder"*.
E.E. Ferrero, L. Foini, T. Giamarchi, A.B. Kolton, A. Rosso.
Annual Reviews: Condensed Matter Physics **12**, 111-134 (2021)
22. *"Properties of the density of shear transformations in driven amorphous solids"*.
E.E. Ferrero, E.A. Jagla
J. Phys.: Condens. Matter **33**, 124001 (2021)
21. *"Elastic Interfaces on Disordered Substrates: From Mean-Field Depinning to Yielding"*.
E.E. Ferrero, E.A. Jagla
Physical Review Letters **123**, 218002 (2019)
20. *"Criticality in elastoplastic models of amorphous solids with stress-dependent yielding rates"*.
E.E. Ferrero, E.A. Jagla
Soft Matter, **15**, 9041 (2019).

19. “*Deformation and flow of amorphous solids: Insights from elastoplastic models*”.
A. Nicolas, E.E. Ferrero, K. Martens, J.-L. Barrat.
Reviews of Modern Physics, **90**, 045006 (2018)
18. “*Creep dynamics of athermal amorphous materials: a mesoscopic approach*”.
C. Liu, E.E. Ferrero, K. Martens, J.-L. Barrat.
Soft Matter, **14**, 8306 (2018).
17. “*Damage accumulation in silica glass nanofibers*”.
S. Bonfanti, E.E. Ferrero, A.L. Sellerio, R. Guerra, and S. Zapperi.
Nano Letters **18**, 7, 4100 (2018).
16. “*Magnetic domain wall creep and depinning: a scalar field model approach*”.
N.B. Caballero, E.E. Ferrero, A.B. Kolton, J. Curiale, V. Jeudy, S. Bustingorry.
Physical Review E, **97**, 062122 (2018).
15. “*Spatiotemporal Patterns in Ultraslow Domain Wall Creep Dynamics*”.
E.E. Ferrero, L. Foini, T. Giamarchi, A.B. Kolton, A. Rosso.
Physical Review Letters, **118**, 147208 (2017).
14. “*Inertia and universality of avalanche statistics: The case of slowly deformed amorphous solids*”.
K. Karimi, E.E. Ferrero, J.-L. Barrat.
Physical Review E, **95**, 013003 (2017).
13. “*Driving rate dependence of avalanche statistics and shapes at the yielding transition*”.
C. Liu, E.E. Ferrero, F. Puosi, J.-L. Barrat, K. Martens.
Physical Review Letters, **116**, 065501 (2016).
12. “*Edwards thermodynamics for a driven athermal system with dry friction*”.
G. Gradenigo, E.E. Ferrero, E. Bertin, J.-L. Barrat.
Physical Review Letters, **115**, 140601 (2015).
11. “*Relaxation in yield stress systems through elastically interacting activated events*”.
E.E. Ferrero, K. Martens, J.-L. Barrat.
Physical Review Letters, **113**, 248301 (2014).
10. “*Parallel kinetic Monte Carlo simulation of Coulomb glasses*”.
E.E. Ferrero, A.B. Kolton, M. Palassini.
AIP Conference Proceedings, **1610**, 71 (2014).
9. “*Uniqueness of the thermodynamic limit for driven disordered elastic interfaces*”.
A.B. Kolton, S. Bustingorry, E.E. Ferrero and A. Rosso.
Journal of Statistical Mechanics: Theory and Experiment (JSTAT), P12004 (2013).
8. “*Numerical Approaches on Driven Elastic Interfaces in Random Media*”.
E.E. Ferrero, S. Bustingorry, A.B. Kolton, A. Rosso.
Comptes Rendus Physique, **14**, 641 (2013).
7. “*Non-steady relaxation and critical exponents at the depinning transition*”.
E.E. Ferrero, S. Bustingorry, A.B. Kolton.
Physical Review E, **87**, 032122 (2013).
6. “*Dynamical heterogeneities as fingerprints of a backbone structure in Potts models*”.
E.E. Ferrero, F. Romá, S. Bustingorry, P.M. Gleiser.
Physical Review E, **86**, 031121 (2012).
5. “*q-state Potts model metastability study using optimized GPU-based Monte Carlo algorithms*”.
E.E. Ferrero, J.P. De Francesco, N.Wolovick and S.A. Cannas.
Computer Physics Communications, **183**, 1578 (2012).
4. “*Short-time dynamics of finite-size mean-field systems*”.
C. Anteneodo, E.E. Ferrero and S.A. Cannas.
Journal of Statistical Mechanics: Theory and Experiment (JSTAT), P07026 (2010).

3. “Non-equilibrium Characterization of Spinodal Points using Short Time Dynamics”.
E.S. Loscar, E.E. Ferrero, T.S. Grigera and S.A. Cannas.
Journal of Chemical Physics, **131**, 024120 (2009)
2. “Long-term ordering kinetics of the two-dimensional q-state Potts model”.
E.E. Ferrero, S.A. Cannas.
Physical Review E **76**, 031108 (2007).
1. “Phase separation of the Potts model in the square lattice”.
M. Ibáñez de Berganza, E.E. Ferrero, S.A. Cannas, V. Loreto, A. Petri.
The European Physical Journal: Special Topics, **143**, 273 (2007).

Teaching experience

- 2017 **Teaching Assistant**, *Università degli Studi di Milano*, Milan, Italy, Subject: “Introduction to Statistical Physics”.
- 2012 **Honorary teacher**, *Instituto Balseiro*, Bariloche, Argentina, Subject: “Introduction to numerical computing in graphics processors (ICNPG2013)”.
- 2008-2011 **Teaching Associate**, *Facultad de Ciencias Químicas, Universidad Nacional de Córdoba*, Subjects: “Mathematics I and II”.
- 2004-2006 **Undergraduate Teaching Assistant**, *Facultad de Matemática, Astronomía y Física, Universidad Nacional de Córdoba*, Subjects: “Algebra II”, “Thermodynamics and Statistical Mechanics I and II”.

Congress/schools/workshops organization

- 2021 **Buenos Aires, Argentina**, *Powders&Grains 2021*, Organizer.
- 2019 **Bariloche, Argentina**, *Yielding phenomena in disordered systems: the southernmost STAT-PHYS satellite*, Organizer.
- 2016 **Grenoble, France**, *Dynamical phase transitions in driven systems: contrasting depinning and yielding*, Organizer.
- 2014 **Grenoble, France**, *Driven Disordered Systems 2014*, Organizer.
- 2011 **Córdoba, Argentina**, *First Argentinean School on GPGPU Computing for Scientific Applications*, Organizer.

Participation in international schools

- Jul 2017 **Como, Italy**, *Advances in complex systems: Lake Como School of Advanced Studies*.
- Jul 2015 **Barcelona, Spain**, *Programming and Tuning Massively Parallel Systems summer school (PUMPS)*.
- Feb 2012 **Trieste, Italy**, *Advanced School on Scientific Software Development: Concept and Tools*.
- Dec 2011 **Santiago, Chile**, *Summer School and Workshop "Fluctuations and Nonequilibrium Systems 2011"*.
- Aug 2009 **Leuven, Belgium**, *International Summer School: “Fundamental Problems in Statistical Physics XII”*.
- Dec 2008 **San Carlos de Bariloche, Argentina**, *Santa Fe Institute (SFI) Complex Systems Summer School: “Foundations and Frontiers of Complex Systems”*.
- Aug 2008 **Les Houches, France**, *Les Houches Summer School “Long-Range Interacting Systems”*.
- Feb 2007 **Bento Goncalves, Brasil**, *2nd Latin American School and conference in Statistical Physics and Interdisciplinary Applications*.
- Dec 2006 **Mar del Plata, Argentina**, *Pan American Scientific Institute (PASI) Summer School: “Disorder and Complexity”*.

Oral contributions

At international conferences/workshop/schools

- March 2021 **USA (virtual)**, *APS March Meeting*, **conference**, “Avalanche statistics at the yielding transition of amorphous solids: universality in elastoplastic models (Abstract: V05.00003)”.
- Oct 2020 **Barcelona, Spain (virtual)**, *Workshop on Micromechanics, Statistics and Hazards of Mechanical Failure*, **workshop**, “Avalanche statistics at the yielding transition of amorphous solids: universality in elastoplastic models”.
- Feb 2019 **Les Houches, France**, *Avalanche Dynamics and Precursors of Catastrophic Events*, **workshop**, “An overview of universal avalanche statistics at the yielding transition of amorphous solids”.
(invited speaker)
- Dec 2018 **Puerto Varas, Chile**, *Southern Workshop on Granular Materials 2018*, **workshop**, “Criticality and avalanches at the yielding transition of amorphous solids”.
(invited speaker)
- October 2017 **Paris, France**, *Yielding of amorphous solids*, **workshop**, Involved chair role.
- October 2016 **Dijon, France**, *8th Multiscale Materials Modeling international conference*, **conference**, “Avalanche statistics when approaching (or leaving) the yielding transition of amorphous solids”.
- July 2016 **Lyon, France**, *STATPHYS26*, **conference**, “Spatio-temporal patterns in ultra-slow creep dynamics of magnetic interfaces”.
- June 2016 **Aussois, France**, *Statphys26 satellite meeting: Statistical Physics of Materials*, **workshop**, “Avalanche statistics at the yielding transition of amorphous solids - driving rate dependence and inertial effects -”.
- June 2016 **Lyon, France**, *CECAM Workshop: The flow of amorphous solids, from atomistic simulations to Earth Science applications*, **workshop**, “Spatio-temporal patterns in ultra-slow domain wall creep dynamics”.
- Feb 2016 **Vienna, Austria**, *41st Conference of the Middle European Cooperation in Statistical Physics*, **conference**, “Driving rate dependence of avalanche statistics and shapes at the yielding transition”.
- Jul 2015 **Barcelona, Spain**, *Programming and Tuning Massively Parallel Systems summer school (PUMPS)*, **poster intro**, “A display of GPU implementations in Condensed Matter Physics: four distinctive cases”.
- Jun 2015 **Montpellier, France**, *ANR project meeting*, Laboratoire Charles Coulomb, Université Montpellier II, **mini workshop**.
“On the rate dependence of avalanche statistics and shapes at the yielding transition”
- May 2015 **Montpellier, France**, *International Workshop on Dynamics in Viscous Liquids*, **conference**, “Relaxation in yield stress systems through elastically interacting activated events”.
- Mar 2015 **Buenos Aires, Argentina**, *Dynamics in soft and hard condensed matter*, **conference**, “Avalanches and relaxation in mesoscopic models of amorphous solids”.
- Dec 2014 **Grenoble, France**, *FAPRES ANR project kick-off meeting*, **mini workshop**, “Relaxation in yield stress systems through elastically interacting activated events”.
- Apr 2014 **Grenoble, France**, *The CIMENT cluster users’ day*, **mini workshop**, “Mesoscopic simulations of amorphous systems using GPU-based algorithms”.
- Feb 2012 **Trieste, Italy**, *Advanced School on Scientific Software Development: Concept and Tools*, **school talk**, “GPU-implementation of the Langevin Dynamics for Driven Elastic Interfaces in Random media”.
- Aug 2009 **Leuven, Belgium**, *International Summer School: “Fundamental Problems in Statistical Physics XII”*, **poster intro**, “Non-equilibrium Characterization of Spinodal Points using Short Time Dynamics”.

- Dec 2008 **San Carlos de Bariloche, Argentina**, *SFI Complex Systems Summer School: “Foundations and Frontiers of Complex Systems”*, **poster intro**, “Network effects on game dynamics”.
- Aug 2008 **Les Houches, France**, *Les Houches Summer School “Long-Range Interacting Systems”*, **school talk**, “Long-term ordering kinetics of the two-dimensional q -state Potts model”.

As international seminars

- More than 25 seminars given as a visitor or in group meetings between 2012 and 2021. Only last 5 listed
- Jan 2021 **Amsterdam, Netherlands (virtual)**, *Computational Soft Matter Seminar, University of Amsterdam.*, **workshop**, “Avalanche statistics and criticality at the yielding transition of amorphous solids”.
(invited)
- Nov 2020 **Bristol, UK (virtual)**, *Fluids and Materials seminar, School of Mathematics Research, University of Bristol.*, **workshop**, “Avalanche statistics and criticality at the yielding transition of amorphous solids”.
(invited)
- Oct 2019 **Grenoble, France**, *Laboratoire International de Physique, PSM group seminars*, **visit**, “Criticality in elastoplastic models of amorphous solids with stress-dependent yielding rates”.
- Feb 2019 **Laussane, Switzerland**, *Prof. Wyart’s group meeting, École Polytechnique Fédérale de Lausanne*, **visit**, “An overview of universal avalanche statistics at the yielding transition of amorphous solids”.
- Nov 2017 **Segrate, Italy**, *Dipartimento di Biotecnologie Mediche e Medicina Traslazionale, UNIMI*, **visit**, “Deformation and flow of amorphous solids”.

At national conferences/workshop/schools

- May 2021 **Córdoba, Argentina (virtual)**, *XVIII Taller Regional de Física Estadística y Aplicaciones a la Materia Condensada, (TREFEMAC 2021)*, **workshop**, “An overview of the yielding transition of amorphous solids”.
(contributed talk)
- Sep 2020 **Córdoba, Argentina (virtual)**, *105º Reunión de la Asociación Física Argentina, (RAFA 2020)*, **conference**, “Plastic deformation of amorphous solids: critical aspects of the yielding transition”.
(Soft Matter Division talk)
- Apr 2019 **San Luis, Argentina**, *XVII Taller Regional de Física Estadística y Aplicaciones a la Materia Condensada, (TREFEMAC 2019)*, **workshop**, “Criticality and avalanches at the yielding transition of amorphous solids”.
(invited speaker)
- May 2011 **Córdoba, Argentina**, *First Argentinian School in GPGPU Computing for Scientific Applications*, **lecture**, “GPGPU applications of Monte Carlo in spin models”.
- Sep 2010 **Malargüe, Argentina**, *95a National Physics Meeting (RNF)*, **conference**, “Dynamics of the ferromagnetic q -state Potts model”.
- May 2007 **San Rafael, Argentina**, *V Regional Workshop on Statistical Physics and Condensed Matter Applications (TREFEMAC)*, **conference**, “Long term ordering dynamics of the q -state Potts model”.

As national seminars

- More than 12 local seminars given between 2009 and 2013 and from 2018 to 2020

Editorial activity

- since 2018 **Managing Editor**, *Papers in Physics*.
link **Referee**, see *Publons record*.

- since 2021 **Referee**, for *Nature Research publishing*, Communications Physics, regular articles.
- since 2020 **Referee**, for *The National Academy of Sciences*, PNAS, regular articles.
- since 2019 **Referee**, for *The American Chemical Society*, Macromolecules, regular articles.
- since 2018 **Referee**, for *The Royal Chemical Society*, Soft Matter, regular articles.
- since 2017 **Referee**, for *The American Physical Society*, Physical Review Letters, Physical Review B, Physical Review E, regular articles.
- since 2015 **Referee**, for *Springer*, Cluster Computing (CLUS), regular articles.
- since 2015 **Referee**, for *Elsevier*, Computer Physics Communications (CPC), regular articles.
- 2015 **Evaluator**, *Asociación Física Argentina*, Giambiagi Prize 2015.
- 2014 **Referee**, *Cluster Computing*, HPCLatAm14 proceedings.
- 2012 **Referee**, *Cluster Computing*, HPCLatAm12 proceedings.

Evaluation activity

- Since 2020 **Thesis Comitee**, *Pontifica Universidad Católica de Chile*, Physics PhD candidate: Carlos Villaroel, Advisor: Gustavo During.
- Dec 2018 **Thesis Evaluator**, *Instituto Balseiro. Universidad Nacional de Cuyo*, Master in Physics Thesis: PUIG, Joaquín Roberto, Termodinámica, estructura y magnetismo de nanocristales de vórtices.
- 2012 **Project Evaluator**, *Universidad Nacional de San Luis*, Topics, advisors and project for a PhD Thesis in Computational Sciences.

Principal investigator founded projects

- 2021-2024 **PIP2020**, *Argentinean National Research Council - CONICET*, Argentina, Statistical Physics of Amorphous Materials. Dir: E.E. Ferrero and E.A. Jagla.
Under evaluation
- 2021-2023 **Director of postdoctoral fellowship**, *CONICET (Argentinean National Research Council)*, Argentina, Postdoc: Stefano Polizzi. “Creep dynamics, thermal rounding and activated avalanches in the plastic deformation of amorphous solids”.
Funded. Not started
- 2021-2023 **Director of postdoctoral fellowship**, *CONICET (Argentinean National Research Council)*, Argentina, Postdoc: Mubeena Shaikh. “Brittle and ductile behaviors of glasses at the onset of yielding: residual stresses and shear banding”.
Funded. Not started
- 2020-2022 **Director of postdoctoral fellowship**, *CONICET (Argentinean National Research Council)*, Argentina, Postdoc: Gieberth Rodríguez-López. “Avalanches, memory and precursors of catastrophic events in the plastic deformation of amorphous solids”.
Funded. Starting August 2021 (delayed due to pandemics)
- 2018-2020 **PICT2017**, *National Agency for Science and Technology Promotion - ANPCyT*, Argentina, Plastic Deformation of Amorphous Solids. Dir: E.E. Ferrero.
Founded AR\$210000

Active writing of founding projects

- 2019 **International Research Project (IRP): Bariloche, Bahía Blanca, Grenoble, Paris**, CNRS, France, Statistical Physics of Materials. Dir: V. Lecomte and A.B. Kolton.
Granted for 2021-2025
- 2016 **ECOS-SUD call for collaboration projects**, *COFECUB ECOS-SUD Université Paris 13*, France, Avalanches and Fluctuations in the Plastic Deformation of Solids. Dir: J.-L. Barrat and E.A. Jagla.
Granted for 2017-2019

- 2014 **GENCI call for TGCC computing hours**, *GENCI (Grand Équipement National de Calcul Intensif)*, France, Large scale simulations of plasticity and avalanches in amorphous systems: a mesoscopic approach. Dir: J.-L. Barrat.
Granted: 40000 computing hours
- 2012 **SNCAD Economic support for workshops and courses**, *SNCAD (Sistema Nacional de Computación de Alto Desempeño)*, Argentina, Introduction to Numerical Calculus in Graphics Processors (ICNPG 2013). Dir: F. Colavecchia.
Granted: founding for two visiting teachers and 15 student fellowships
- 2011 **NVIDIA Academic Partnership**, *NVIDIA corporation*, USA, Condensed Matter implementations in GPUs. Dir: D. Domínguez.
Granted: 2 Fermi GPUs

Further academy-related activities

Membership

since 2002 Member of the Argentinean Physics Association

Government

- 2021–... Member of the Nanoscience and Nanotechnology Institute Council Board (Bariloche node)
- 2008–2011 Member of the Córdoba Subsidiary of the Argentinean Physics Association Board of Directors
- 2008–2010 Councilor in the Board of Governors of FaMAF (graduate senate)
- 2001–2002, 2002–2003 Councilor in the Board of Governors of FaMAF (student senate)

Assistance

- 2007 Collaborator at XII Ibero-American Physics Olympiad
- 2006, 2010, 2011 Collaborator at Argentinean Physics Olympiad

Scientific interests

- Phase Transitions, Soft Matter, Condensed Matter, Geophysics
- Disordered Systems, Complex Systems, Magnetic Systems
- Amorphous Solids, Glasses, Complex Fluids, Active Matter, Metamaterials
- Computational Physics, GPU Computing, Machine Learning

Languages

- Fluid Spanish, English, French
- Average Italian
- Basic Portuguese

Notice: This file contains hyperlinks.

Last updated July 15, 2021.