

Valentina Ros | CV

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Last update: December 2025

Employment and Education

- **Laboratoire de Physique Théorique et Modèles Statistiques** Orsay, France
Chargé de Recherche, CNRS 2020–current
- **Laboratoire de Physique, École Normale Supérieure** Paris, France
Junior Research Chair, Independent Post-Doc position 2019–2020
- **Laboratoire de Physique Statistique, École Normale Supérieure** Paris, France
Post-Doc position, Mentor: Prof. G. Biroli 2018–2019
- **Institut de Physique Théorique, CEA/Saclay** Paris, France
Post-Doc position, Mentor: Prof. G. Biroli 2016–2018
- **SISSA- International School for Advanced Studies** Trieste, Italy
Ph.D. in Statistical Physics. Degree obtained on 13/10/2016 2012–2016
- **Ludwig Maximilians Universität** München, Germany
TMP-Elite Master in Theoretical and Mathematical Physics 2010 - 2012
- **Università degli Studi di Trieste** Trieste, Italy
Bachelor in Physics 2007 - 2010

Qualifications

- 2024: **Abilitazione Scientifica Nazionale 02/A2**, Italy [HDR-equivalent]
- 2016: **Ph.D. in Statistical Physics**
Thesis: *Aspects of localization in disordered many-body quantum systems*
Advisors: Dr. Markus Mueller and Dr. Antonello Scardicchio
Approved *cum laude*
- 2012: **Master in Theoretical and Mathematical Physics**
Thesis: *On the Lifshitz tails phenomenon for the density of states of Anderson Hamiltonians on trees*
Advisor: Prof. Dr. Simone Warzel
ECTS-Grade: A, Passed *with high distinction*
- 2010: **Bachelor Degree in Physics**
Thesis: *Collasso della funzione d'onda e relatività*
Advisor: Dr. Angelo Bassi
Final Grade: 110/110 *cum laude and president awards honors*

Funding, fellowships, awards

- 2025 - **International Research Project (IRP)**, Campagne IRP CNRS Physique 2025
Project: HiDiNGS , with Bertrand Lacroix-A-Chez-Toine, Pierre Le Doussal, Yan V. Fyodorov
- 2024 - **Visiting grant of IdEx Paris-Saclay**, Appel a Projets PhOM Visiteur 2024
Project: NAMHiDiCS, with Bertrand Lacroix-A-Chez-Toine, Reference: ANR-11-IDEX-0003
- 2024 - **Research grant of IdEx Paris-Saclay**, Appel a Projets PhOM 2024
Project: HighDynAsy, Reference: ANR-11-IDEX-0003
- 2022 - **Early Career Researcher Best Paper Prize** of the Journal of Physics A: Mathematical and Theoretical. Paper: V.Ros, *Distribution of rare saddles in the p -spin energy landscape*, J. Phys. A: Math. Theor. 53 12500 (2020)
- 2022 - **Projets Fil de l'eau visiteur, Investissements d'Avenir du LabEx PALM**
Project: GlassMan, with Elisabeth Agoritsas, Reference: ANR-10-LABX-0039-PALM
- 2021 - **Chaire junior interne, Investissements d'Avenir du LabEx PALM**
Project: HighDyn, Reference: ANR-10-LABX-0039-PALM
- 2019 - **EPS Statistical and Nonlinear Physics Early Career Prize** of the European Physical Society
- 2019 - **Marie Skłodowska-Curie Individual Fellowship** (*declined*)
Project: HighDLands
- 2019 - **Junior Research Chair fellowship** at École Normale Supérieure
- 2016 - **Distinguished referee 2016** of EPJ-The European Physical Journal
- 2012 - **PhD fellowships in Statistical Physics** at International School for Advanced Studies, Trieste
- 2012 - **PhD fellowships in Mathematical Physics** (*declined*) at International School for Advanced Studies, Trieste

Supervision

- 2025-2028: **PhD advisor** of T. Louis-Sarrola.
- 2022-2025: **PhD advisor** of A. Pacco, co-supervised with A. Rosso. Defended on 15/10/25.
- 2025: **Research Internship advisor** of T. Louis-Sarrola, enrolled in the international master Physics of Complex Systems.
- 2024: **Research Internship advisor** of T. Roy, enrolled in the master Physique Fondamentale et Applications of Sorbonne Université.

- 2022: **Research internship advisor** of A. Pacco, enrolled in the master of fundamental physics of ICFP-International Centre for Fundamental Physics.

Teaching and courses

Courses at masters.....

- Winter 2025 - **Lectures and exercises** for the course *Disordered Systems*, M2 of Master Physics of Complex Systems, Paris.
- March 2025 – **Invited Lectures** (8h) at the Department of Mathematics of King's College London, for the *module CS07 of the MSc Complex Systems*, London (Responsible of module: Bertrand Lacroix-A-Chez-Toine).
- Spring 2024, 2025 - **Lectures and exercises** for the course *Statistical Physics of Disordered Systems*, M2 of Master in fundamental physics: international centre for fundamental physics, Paris (Co-lecturer: Dr. A. Rosso).
- Spring 2020, 2021, 2022, 2023 – **Exercise sessions** for the course *Complex systems: from physics to social sciences*, M2 of M2 of Master in fundamental physics: international centre for fundamental physics, Paris (Lecturer: Prof. J. P. Bouchaud).
- Winter 2019 – **Exercise sessions** for the course *Statistical Physics: Concepts and Applications*, M1 of Master in fundamental physics: international centre for fundamental physics, Paris (Lecturer: Prof. W. Krauth).

Courses at PhD schools.....

- 10/2024 – **Lectures** on *High-dimensional random landscapes*, Thematic school Optimization and Algorithms, CIMI - Centre International de Mathématiques et Informatique de Toulouse, Toulouse (France).
- 09/2024 – **Lectures** on *Disordered systems and non-equilibrium dynamics*, Nordita Summer School on Quantum Chaos, Dissipation and Information, Nordita, Stockholm (Sweden)
- 07/2024 – **Lectures** on *High-dimensional random landscapes* at Complex and Glassy Systems, Institut d'Études Scientifiques de Cargèse, Corse (France) and at Theory of Large Deviations and Applications, Les Houches School of Physics (France)
- 03/2023 – **Lectures** on *Eigenstate Thermalization Hypothesis, and its violations*, Dynamical Foundations of Many-Body Quantum Chaos, Institut Pascal, Orsay (France)
- 02/2022 – **Lectures** on *An introduction to (Many-Body) Localization*, Statistical Field Theory school, Galileo Galilei Institute, Florence (Italy)
- 10/2021 – **Lectures** on *High-dimensional counting problems and random matrix theory*, École d'automne du GDR MEGA, Saint-Malo (France)
- 09/2020 – **Lectures** on *The basics of many body localization*, School on Clean and

Disordered Systems Out-of-Equilibrium, Institut d'Études Scientifiques de Cargèse, Corse (France)

Organization of Scientific Events

- 2026: Program *New trends in non-equilibrium dynamics*, KITP Santa Barbara (California), May-July 2026.
- 2025: Program *The Lush World Of Random Matrices*, Zif Bielefeld (Germany), September-December 2025. Three program's workshops:
 - *Random Matrix Theory for Learning and Statistical Physics*, 8-12/09
 - *Random Matrix Theory for Ecology, Economics, Finance and Statistical Physics*, 27-31/10
 - *XXI Brunel-Bielefeld Workshop on Random Matrix Theory and Applications*, 8-12/12
- 2025: Summer school *Fundamental Problems in Statistical Physics XVI* held in Oropa, Biella (Italy), 30/06-11/07
- 2024: Workshop *Class Imbalance in Machine Learning*, Orsay (France), 15/11.
- 2024: Workshop *From Machine-Learning Theory to Driven Complex Systems and back*, CECAM, Lausanne (Switzerland), 22-24/05.
- 2023: Conference *Journées Interdisciplinaires de Physique Statistique*, Orsay (France), 30-31/03.
- 2022: Spring School *Interdisciplinary Challenges: from Non-equilibrium Physics to Life Sciences*, Edinburgh (UK), 25-29/04.
- 2024-now: Seminar series **MLP@P - Machine Learning Physics at the Plateau**.
- 2021-2024: Seminar series **LPTMS weekly general seminars**, LPTMS.
- 2019-2020: Seminar series **Forum of Statistical Physics**, École Normale Supérieure.

Scientific talks, seminars and posters

Invited talks at conferences and seminars.....

- 12/2025- **Journée du RT Mathématiques et Physique**, Toulouse, France.
- 07/2025- **Classical and Quantum Complexity in Statistical Mechanics**, Molveno, Italy.
- 06/2025- **Stochastic Geometry Days 2025**, Grenoble, France.
- 06/2025- **Seminars in Mathematical Physics and Beyond**, University of Bologna, Italy.
- 04/2025- **Recent Advances in Disordered Systems**, CY Advanced Studies, France.

- 02/2025- **Towards a Theory for Typical-Case Algorithmic Hardness**, Les Houches, France.
- 01/2025- **Problèmes Spectraux en Physique Mathématique**, IHP Paris, France.
- 12/2024- **Classical and quantum dynamics in out of equilibrium system**, ICTS Bangalore, India.
- 10/2024- **Ecological networks, complex systems, stability**, Université Gustave Eiffel Paris, France.
- 10/2024- **Random tensors and related topics** , IHP Paris, France.
- 08/2024- **Workshop on Localization and Ergodicity**, ICTP Trieste, Italy.
- 06/2024- **Machine Learning Physics @ Plateau seminar**, LISN, Université Paris Saclay, France.
- 05/2024- **Stochastic Models and Experiments in Ecology and Biology** , GSSI L'Aquila, Italy.
- 12/2023- **XIX Brunel - Bielefeld Workshop on Random Matrix Theory and Applications** , Zif Bielefeld, Germany.
- 11/2023- **MEGA (Matrices et Graphes Aléatoires) Seminar**, Paris, France.
- 09/2023- **Disordered Systems Days**, KCL London, Uk.
- 07/2023- **Quantum Localization and Glassy Physics**, Cargese, Corse.
- 06/2023- **High Dimensional Statistics and Random Matrices**, Porquerolles, France.
- 04/2023- **CEA Artificial Intelligent Chair seminar**, Saclay, France.
- 01/2023- **FRESK Quantitative Biology seminar**, Paris, France.
- 11/2022- **1ères Journées du GDR Interaction Désordre Élasticité**, Grenoble, France.
- 11/2022- **Ergodicity breaking and integrability in long-range systems and on random graphs**, Stockholm, Sweden.
- 10/2022- **Wave Localization and Many-Body Localization in Quantum Information**, Cargese, Corse.
- 10/2022- **Two days with Giorgio Parisi in Paris** , Paris, France.
- 09/2022- **Universal Structures in Probabilistic Models** , Cologne, Germany.
- 05/2022- **Statistical Physics and Low-D Systems**, Pont-a-Mousson, France.
- 04/2022- **IPhT - Lptms Stat Phys Day**, CEA Saclay, France.
- 03/2022- **Simons Cracking the Glass Problem annual meeting**, Simons Foundation, New York.
- 02/2022- **Statistical Physics and Complexity Webinar Series**, The University of Edinburgh, Scotland (*online talk*).

- 12/2021- **SIFS Plenary colloquium**, Società Italiana di Fisica Statistica, Italy (*online talk*).
- 12/2021- **29th Colloque Alain Bouyssy**, Paris Saclay University, France.
- 11/2021- **Random Matrices, Physics and Machine Learning**, ENS Center for Data Sciences, France.
- 09/2021- **News from disordered elastic systems**, Anargyrios & Korgialenios School of Spetses, Greece.
- 07/2021- **Glassy Systems and Inter-Disciplinary Applications**, Institut d'Études Scientifiques de Cargèse, Corse.
- 05/2021- **Joint ICTP-SISSA statistical physics seminar**, International School for Advanced Studies, Trieste, Italy (*online talk*).
- 04/2021- **Interdisciplinary Challenges in Nonequilibrium Physics**, Erwin Schroedinger Institute, University of Vienna, Austria (*online talk*).
- 03/2021- **Physics colloquium**, Emory University, Atlanta, Georgia (*online talk*).
- 01/2021 - **Séminaire du LPTMS**, LPTMS Orsay, France (*online talk*).
- 01/2021- **Recent advances on the glass problem**, Cecam digital meeting, Lausanne, Switzerland (*online talk*).
- 11/2020 - **GSSI-TNT-Sapienza Statistical Mechanics Webinars**, Gran Sasso Science Institute and Università La Sapienza, L'Aquila and Rome, Italy (*online talk*).
- 07/2020- **Youth in High-dimensions: Machine Learning, High-dimensional Statistics and Inference for the New Generation**, ICTP, Trieste, Italy (*online talk*).
- 05/2020 - **Probability and Stats seminar**, Department of Mathematics and Computer Science, Basel University, Switzerland (*online talk*).
- 04/2020 - **Séminaire MSC**, Laboratoire MSC, Paris Diderot, Paris, France (*online talk*).
- 12/2019 - **CANES seminar**, King's College London, London, United Kingdom.
- 10/2019 - **Séminaire LPTMC**, LPTMC, Sorbonne Université, Paris, France.
- 11/2019- **1st French-German meeting in Physics, Mathematics and Artificial Intelligence**, Centre culturel Irlandais, Paris, France.
- 10/2019 - **Statistical Physics Forum**, Département de Physique, ENS Paris, France.
- 09/2019- **40 years of Replica Symmetry Breaking**, La Sapienza University, Rome, Italy.
- 09/2019- **Quantum and physics based machine learning workshop**, DALI 2019, San Sebastian, Spain.
- 06/2019- **Breakdown Of Ergodicity In Isolated Quantum Systems: From Glassiness To Localization**, GGI Firenze, Italy.

- 05/2019- **Statistical Physics of Complex Systems**, Nordita Stockholm, Sweden.
- 03/2019- **APS March Meeting 2019**, Boston, Massachusetts.
- 02/2019 - **Seminar at "the Rough High-Dimensional Landscape Problem" program**, KITP, Santa Barbara, California.
- 02/2019- **Séminaire de Physique Mathématique/Physique Statistique**, LPHE, Sorbonne Université, France.
- 11/2018- **Condensed Matter and Nanoscience Seminar**, School of Physics and Astronomy, Nottingham, United Kingdom.
- 10/2018- **Séminaire du LPTMS**, LPTMS, Orsay, France.
- 04/2018- **High Dimensional Dynamics Conference**, The CUNY Graduate Center, New York.
- 01/2018- **Statistical Physics Seminar**, IPhT, Saclay, France.
- 12/2017- **NYU Probability and Mathematical Physics seminar**, Courant Institute, New York.
- 07/2017- **Many-Body-Localization: Advances in the Theory and Experimental Progress**, ICTP, Trieste, Italy.
- 02/2017- **Trieste Quantum Days 2017**, SISSA, Trieste, Italy.
- 05/2016- **Analysis, Math-Phys, and Quantum seminar**, SISSA, Trieste, Italy.
- 03/2016- **Quantum 2016**, ICTP, Trieste, Italy.
- 06/2015- **Spring college on the physics of complex systems**, ICTP, Trieste, Italy.
- 09/2014- **Theoretical condensed matter seminar**, Basel University, Switzerland.

Contributed talks and posters.....

- 10/2021- **Ergodicity Breaking and Anomalous Transport in Quantum Many-Body Systems [talk]**, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany.
- 06/2021- **Stochastic Models and Experiments in Ecology and Biology [talk]**, European Center of Living Technology, Venice, Italy.
- 03/2019- **Simons Collaboration on Cracking the Glass Problem Annual Meeting [poster]**, Simons Foundation, New York City, New York.
- 06/2018- **Unifying concepts in glass physics VII [talk]**, University of Bristol, Bristol, United Kingdom.
- 09/2018- **Disordered serendipity: a glassy path to discovery [poster]**, La Sapienza University, Rome, Italy.
- 03/2017- **Simons Collaboration on Cracking the Glass Problem Annual Meeting [poster]**, Simons Foundation, New York City, New York.

- 03/2015- **Many-Body dynamics out of equilibrium [poster]**, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany.

Science Dissemination

- 11/2024- **Seminar "Physics Now" for ICFP master students**, Paris, France.
- 12/2022 - Seminar for the course "Comunicare la fisica e la matematica" at the **Master in Scientific communication** Franco Praticco, SISSA, Trieste, Italy.

Other working activities

Editing and refereeing.....

- **Editorial Board** of the Journal of Physics A: Mathematical and Theoretical
- **Editor** of JSTAT - Journal of Statistical Mechanics: Theory and Experiment
- **Referee** for the following scientific journals:
 - PRL - Physical Review Letters
 - PRB - Physical Review B
 - PRE - Physical Review E
 - Physical Review Research
 - EPJ-The European Physical Journal
 - Quantum - the open journal for quantum science
 - EPL - Europhysics letters
 - Journal of Physics A: Mathematical and Theoretical
 - Physica A: Statistical Mechanics and its Applications
 - JSP - Journal of Statistical Physics
 - Scipost Physics
 - PLOS Computational Biology

I am trying to reduce my commitment with Elsevier and Springer.

Participation to juries.....

- **Jury member** (examinatrice) of 9 PhD defenses in France: Thibaut Arnoulx De Pirey (Université de Paris, 2021), Mohamed Ouerfelli (Université Paris Saclay, 2022), Imane Akjouj (Université de Lille, 2023), Eugenio Mauri (Ecole Normale de Paris, 2023), Li Gan (Université Paris Saclay, 2023), Jerome Garnier-Brun (Institut Polytechnique, 2023), Vanessa Piccolo (Ecole Normale de Lyon, 2025), Leo Touzo (Ecole Normale de Paris, 2025), Juan Giral Martinez (Ecole Normale de Paris, 2025).
- **Committee member** of 3 PhD defenses in Italy: Sara Murciano (SISSA, 2022), Federico Balducci (SISSA, 2022), Cristiano Muzzi (SISSA, 2025).
- **Jury member** of Master Internship Reports of École Normale Supérieure - Paris (1 in

2019, 4 in 2020, 4 in 2022, 5 in 2023) and of École Normale Supérieure - Paris Saclay (2 in 2021).

Scientific councils and committees.....

- **2022- 2026: Conseil Scientifique of UFR Physique of Sorbonne University.** Nominated member.
- **2022 - 2026: Conseil de Laboratoire** of LPTMS.
- **2025: Steering committee and National committee of *StatPhys29- The 29th international conference on statistical physics***, Florence (Italy), July 13-18, 2025.
- **2025: Committee for recruitment of a maitre de conferences researcher** at the LPTMC, Sorbonne University, Poste 251883 section 29 – Constituants elementaires.
- **2024: Committee for recruitment of a maitre de conferences researcher** at the LPTHE, Sorbonne University, Poste 569 section 29 – Constituants elementaires.
- **2023: A1-FIS/02 committee** for recruitment of an RTDA researcher at the University of Trieste.
- **Comité de suivi** (committees to monitor the scientific progress and wellbeing of PhD students in France) of L. Gan (2020-2023), J. Givois (2021-2024), L. Touzo (2022-2025), A. Marche (2023-2026), D. Prado (2024-2027), H. Ferchichi (2024-2027), L. Kalvoda (2024-2027)

Publication List

Preprints.....

- **Non-reciprocal interactions and high-dimensional chaos: comparing dynamics and statistics of equilibria in a solvable model**
S. J. Fournier, A. Pacco, V. Ros, P. Urbani, arXiv:2503.20908.

Published.....

- **High-dimensional random landscapes: from typical to large deviations**
V. Ros, SciPost Phys. Lect. Notes, 102 (2025).
- **Class Imbalance in Anomaly Detection: Learning from an Exactly Solvable Model**
F.S. Pezzicoli, V. Ros, F.P. Landes, M. Baity-Jesi, The 28th International Conference on Artificial Intelligence and Statistics (2025).
- **Triplets of local minima in a high-dimensional random landscape: correlations, clustering, and memoryless activated jumps**
A. Pacco, A. Rosso, V. Ros, Journal of Statistical Mechanics: Theory and Experiment 2025.3, 033302 (2025).

- **Curvature-driven pathways interpolating between stationary points: the case of the pure spherical 3-spin model**
A. Pocco, G. Biroli, V. Ros, J. Phys. A: Math. Theor. Letters 57, 07LT01 (2024).
- **Overlaps between eigenvectors of spiked, correlated random matrices**
A. Pocco, V. Ros, Phys. Rev. E 108, 024145 (2023).
- **The high-d landscapes paradigm: spin-glasses, and beyond**
V. Ros, Y. V. Fyodorov, Contribution to the book Spin Glass Theory and Far Beyond: Replica Symmetry Breaking after 40 Years, World Scientific (2023) [Review paper.]
- **Quenched complexity of equilibria for asymmetric Generalized Lotka-Volterra equations**
V. Ros, F. Roy, G. Biroli, G. Bunin, J. Phys. A: Math. Theor. 56, 305003 (2023)
- **Generalized Lotka-Volterra equations with random, non-reciprocal interactions: the typical number of equilibria**
V. Ros, F. Roy, G. Biroli, G. Bunin, A. M. Turner, Phys. Rev. Lett. 130, 257401 (2023)
- **Fluctuation driven transitions in localized insulators: Intermittent metallicity and path chaos precede delocalization**
V. Ros, M. Mueller, Physical Review B 104, 094205 (2021). [Editors' suggestion.]
- **Dynamical Instantons and Activated Processes in Mean-Field Glass Models**
V. Ros, G. Biroli, C. Cammarota, SciPost Phys. 10, 002 (2021)
- **Distribution of rare saddles in the p -spin energy landscape**
V. Ros, Journal of Physics A: Mathematical and Theoretical 53 (12), 125002 (2020)
- **Anderson transition on the Bethe lattice: an approach with real energies**
G. Parisi, S. Pascazio, F. Pietracaprina, V. Ros, A. Scardicchio, Journal of Physics A: Mathematical and Theoretical 53 (1), 014003 (2020)
- **Complexity of energy barriers in mean-field glassy systems**
V. Ros, G. Biroli, C. Cammarota, EPL (Europhysics Letters) 126, vol. 2 (2019)
- **Complex energy landscapes in spiked-tensor and simple glassy models: ruggedness, arrangements of local minima and phase transitions**
V. Ros, G. Ben Arous, G. Biroli, C. Cammarota, Phys. Rev. X. 9, 011003 (2019)
- **Remanent magnetization: signature of Many-Body Localization in quantum antiferromagnets**
V. Ros, M. Müller, Phys. Rev. Lett. 118, 237202 (2017)
- **Local integrals of motion in many-body localized systems**
J. Imbrie, V. Ros, A. Scardicchio, Annalen der Physik 529, 1600278 (2017) [Review paper.]
- **The forward approximation as a mean field approximation for the Anderson and Many Body Localization transitions**
F. Pietracaprina, V. Ros, A. Scardicchio, Phys. Rev. B 93, 054201 (2016)

- **Localized systems coupled to small baths: From Anderson to Zeno**
D. Huse, R. Nandkishore, F. Pietracaprina, V. Ros, A. Scardicchio, Phys. Rev. B 92, 014203 (2015)
- **Integrals of motion in the Many-Body Localized phase**
V. Ros, M. Müller, A. Scardicchio, Nuclear Physics B 891, 420 (2015)