

Florent KRZAKALA

Professeur de Physique

Université Pierre & Marie Curie & Ecole Normale Supérieure

Birth: March 22, 1976 in Nancy, France

Other languages: English, Italian, and some czech

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Scientific interests: Statistical physics of disordered systems, out-of-equilibrium dynamics, quantum computing, compressed sensing, constraint optimization problems, neural networks, error correction, machine learning, inverse problems on graphs.

Education and professional experience

- 2015 – Junior member of the Institut Universitaire de France
- 2013 – Professeur de Physique UPMC Paris
Laboratoire de Physique Statistique de l'École Normale Supérieure (CNRS UMR 8505)
- 2011 – Habilitation à diriger des recherches, Dec. 6, Pierre and Marie Curie University, Paris
- 2004-2013 – Maître de conférence in ESPCI, Paris
Laboratoire de Physico-chimie Théorique (CNRS UMR Gulliver 7083)
- 2002-2004 – Post-doc in the group of Prof. G. Parisi in *Università di Roma La Sapienza*
Center of *Statistical Mechanics and Complexity*, Roma, Italy
- 1999-2002 – Ph.D. student with Prof. Olivier C. Martin, LPTMS
Université Paris XI, Orsay, France
- 1998-1999 – Student in the *D.E.A. Champs, Particules, Matière*
Université Paris XI, Orsay, France
- 1994-1998 – Undergraduate Physics studies, Université d'Aix-Marseille III, France

Long scientific visits

- 2016 – UC Berkeley and Simons Institute (four months) *California, USA*
- VII-2015 – Santa Fe Institute (one month) *New Mexico, USA*
- XI-2010 – Tokyo Institute of technology (one month) *Tokyo (Japan)*
- 2008-2010 – Los Alamos Nat. Lab. (12 months) *New Mexico, USA*
- IX-2003 – Institute of Scientific Interchange foundation (one month) *Torino, Italy*
- VII-2003 – Abdus Salam International Center of Theoretical Physics (one month) *Trieste, Italy*

Scientific activities in short

- 69 Talks in confs./schools/workshops, 32 as invited speaker, 5 as lecturer, 2 as keynote.
- 47 Invited international seminars.
- 61 Articles in peer-review journals (inc. 3 PNAS, 14 PRL, 1 PRX, 8 EPL). H-index: 31.
- 35 Articles in peer-review proceedings (mainly computer science: ISIT, NIPS, ICASSP, ICML...)
- 2 reviews, 1 book and 1 chapter in a book.
- 8 International workshops/conferences/schools organized.
- Teaching Physics, Mathematics and Programming.
- Notable grants: ERC, ANR JCJC. Junior member of the IUF
- co-inventor of one patent.

Complete list of publications

Published research articles

1. Boshra Rajaei, Sylvain Gigan, Florent Krzakala, Laurent Daudet, *Fast phase retrieval for high dimensions: A block-based approach* **IEEE Signal Processing Letters** 2016, Volume: 23, Issue: 9
2. Yoshiyuki Kabashima, Florent Krzakala, Marc Mézard, Ayaka Sakata, Lenka Zdeborová, *Phase transitions and sample complexity in Bayes-optimal matrix factorization*, **IEEE Transactions on Information Theory** (Volume:62 , Issue: 7, Pages: 4228 - 4265) 2016
3. Eric Tramel, Angelique Dremeau and Florent Krzakala, *Compressed sensing with Restricted Boltzmann Machine Priors*, **J. Stat. Mech.** (2016) 073401
4. Angelique Dremeau, Antoine Liutkus, David Martina, Ori Katz, Christophe Schülke, Florent Krzakala, Sylvain Gigan, Laurent Daudet, *Reference-less measurement of the transmission matrix of a highly scattering material using a DMD and phase retrieval techniques*, **Optics Express** Vol. 23, Issue 9, pp. 11898-11911 (2015)
5. Jean Barbier, Florent Krzakala, Christophe Schülke, *Compressed sensing and Approximate Message Passing with spatially-coupled Fourier and Hadamard operators*, **J. Stat. Mech.** (2015) P05013
6. Alaa Saade, Florent Krzakala, Lenka Zdeborová, *Spectral density of the non-backtracking operator*, 2014 **Europhys. Letters** 107 50005 (2014).
7. A. Decelle and F. Krzakala, *Belief Propagation Guided Monte-Carlo*, **Phys. Rev. B** 89, 214421 (2014)
8. F. Krzakala, M. Mézard and L. Zdeborová, *Reweighted belief propagation and quiet planting for random K-SAT* , **Journal on Satisfiability, Boolean Modeling and Computation** 8 (2014) 149-171
9. X. Yan, J. E. Jensen, F. Krzakala, C. Moore, C. Rohilla Shalizi, L. Zdeborová, P. Zhang, Y. Zhu, *Model Selection for Degree-corrected Block Models*, **J. Stat. Mech.** (2014) P05007
10. F Krzakala, C Moore, E Mossel, J Neeman, A Sly, L Zdeborová and P Zhang, *Spectral redemption: clustering sparse networks*, **Proc. Natl. Acad. Sci.** 2013.
11. E. Gouillart, F. Krzakala, M. Mézard and L. Zdeborová, *Belief Propagation Reconstruction for Discrete Tomography Model*, **Inverse Problems** 29 (3), 035003 (2013)
12. P. Zhang, F. Krzakala, J. Reichardt, L. Zdeborová *Comparative Study for Inference of Hidden Classes in Stochastic Block Models*, **J. Stat. Mech.** (2012) P12021
13. M. M. Bandi, M. K. Rivera, F. Krzakala and R. E. Ecke, *Fragile Granular Jamming* **Phys. Rev. E** 87 (4), 042205 (2012)
14. Helmut G. Katzgraber, T. Jorg, F. Krzakala, A. K. Hartmann, *Ultrametric probe of the spin-glass state in a field*, **Phys. Rev. B** 86, 184405 (2012).
15. F. Krzakala, M. Mézard, F. Sausset, Y. Sun, L. Zdeborová, *Probabilistic Reconstruction in Compressed Sensing: Algorithms, Phase Diagrams, and Threshold Achieving Matrices*, **J. Stat. Mech.** (2012) P08009
16. Y.F. Sun, A. Crisanti, F. Krzakala, F. Leuzzi, F. Zdeborová, *Following states in temperature in the spherical s+p-spin glass model*, **J. Stat. Mech.** (2012) P07002
17. L. Foini, F. Krzakala, F. Zamponi, *On the relation between kinetically constrained models of glass dynamics and the random first-order transition theory*, **J. Stat. Mech.** (2012) P06013
18. F. Krzakala, M. Mézard, F. Sausset, Y. Sun, L. Zdeborová, *Statistical physics-based*

- reconstruction in compressed sensing*, **Phys. Rev. X** 2, 021005 (2012)
19. T. Jorg and F. Krzakala, *The nature of the different zero-temperature phases in discrete two-dimensional spin glasses: Entropy, universality, chaos and cascades in the renormalization group flow*, **J. Stat. Mech.** (2012) L01001
 20. A. Decelle, F. Krzakala, C. Moore, L. Zdeborová, *Asymptotic analysis of the stochastic block model for modular networks and its algorithmic applications*, **Phys. Rev. E** 84, 066106 (2011)
 21. A. Decelle, F. Krzakala, C. Moore, L. Zdeborová, *Phase transition in the detection of modules in sparse networks*, **Phys. Rev. Lett.** 107, 065701 (2011)
 22. Y. Matsuda, H. Nishimori, L. Zdeborová, F. Krzakala, *Random-field p -spin glass model on regular random graphs*, **J. Phys. A: Math. Theor.** 44 (2011) 185002
 23. F. Krzakala, F. Ricci-Tersenghi, D. Sherrington and L. Zdeborová, *No spin glass phase in ferromagnetic random-field random-temperature scalar Ginzburg-Landau model*, **J. Phys. A: Math. Theor.** 44, 042003 (2011)
 24. F. Krzakala and L. Zdeborová, *Glassy dynamics as a melting process*, **J. Chem. Phys.** 134, 034513 (2011)
 25. F. Krzakala and L. Zdeborová, *Glassy aspects of melting dynamics*, **J. Chem. Phys.** 134, 034512 (2011)
 26. L. Zdeborová and F. Krzakala, *Quiet Planting in the Locked Constraint Satisfaction Problems*, **SIAM J. Discrete Math.** 25, 750-770 (2011)
 27. F. Krzakala and L. Zdeborová, *Following Gibbs States — The Energy Landscape of Mean Field Glassy Systems*, 2010 **EPL** 90 66002
 28. L. Zdeborová and F. Krzakala, *Generalization of the cavity method for adiabatic evolution of Gibbs states*, **Phys. Rev. B** 81, 224205 (2010)
 29. T. Jörg, F. Krzakala, G. Semerjian and F. Zamponi, *First-Order Transitions and the Performance of Quantum Algorithms in Random Optimization Problems*, **Phys. Rev. Lett.** 104, 207206 (2010)
 30. F. Krzakala, F. Ricci-Tersenghi and L. Zdeborová, *Elusive Spin Glass Phase in the Random Field Ising Model*, **Phys. Rev. Lett.** 104, 207208 (2010)
 31. M. Chertkov, L. Kroc, F. Krzakala, M. Vergassola and L. Zdeborová, *Inference in particle tracking experiments by passing messages between images Tracking particles by passing messages between images*, **Proc. Natl. Acad. Sci.** 107, 7663 (2010).
 32. T. Jörg, F. Krzakala, J. Kurchan, A. C. Maggs and J. Pujos, *Energy gaps in quantum first-order mean-field-like transitions: The problems that quantum annealing cannot solve*, **EPL**, 89 (2010) 40004 Subjects
 33. R. Mari, F. Krzakala and J. Kurchan, *Jamming versus Glass Transitions*, **Phys. Rev. Lett.** 103, 025701 (2009)
 34. F. Krzakala and L. Zdeborová, *Hiding Quiet solution in Random Constraint Satisfaction Problems*, **Phys. Rev. Lett.** 102, 238701 (2009)
 35. F. Krzakala, A. Rosso, F. Zamponi and G. Semerjian, *On the path integral representation for quantum spin models and its application to the quantum cavity method and to Monte Carlo simulation*, **Phys. Rev. B** 78, 134428 (2008)
 36. T. Jörg, F. Krzakala, J. Kurchan, A.C. Maggs, *Simple Glass models and their quantum annealing*, **Phys. Rev. Lett.** 101, 147204 (2008)
 37. F. Krzakala, M. Tarzia and L. Zdeborová, *A lattice model for colloidal gels and Glasses*, **Phys. Rev. Lett.** 101, 165702 (2008).

38. T. Jorg, H. Katzgraber and F. Krzakala, *On the ordering of Ising Spin Glasses in a Field*, **Phys. Rev. Lett.** 100, 197202 (2008)
39. L. Zdeborová and F. Krzakala, *Potts Glass on Random Graphs*, 2008 **EPL** 81 57005.
40. T. Jorg and F. Krzakala, *Comment on "Ultrametricity in the Edwards-Anderson Model"*, **Phys. Rev. Lett.** 100, 159701 (2008)
41. L. Zdeborová and F. Krzakala, *Phase Transitions in the Coloring of Random Graphs*, **Phys. Rev. E**, 76 031131(2007)
42. F. Krzakala and J. Kurchan, *A landscape analysis of Constraint Satisfaction Problems*, **Phys. Rev. E**, 76 021122 (2007)
43. F. Krzakala, A. Montanari, F. Ricci-Tersenghi, G. Semerjian and L. Zdeborová, *Gibbs States and the Set of Solutions of Random Constraint Satisfaction Problems*, **Proc. Natl. Acad. Sci.** 104, 10318 2007
44. H. Katzgraber and F. Krzakala, *Temperature and Disorder chaos in three-dimensionnal spin glasses*, **Phys. Rev. Lett.** 98, 017201 (2007).
45. P. Calabrese, A. Gambassi and F. Krzakala *Critical aging of Ising ferromagnets relaxing from an ordered state*, **J. Stat. Mech.** (2006) P06016
46. F. Krzakala and J.P. Bouchaud *Disorder chaos in spin glasses*, **Europhys. Lett.**, 72 (2), 472-4788 (2005)
47. T. Castellani, F. Krzakala and F. Ricci-terseghi, *Solution to spin glass models with ferromagnetically biased couplings on the Bethe lattice*, **Eur. Phys. J. B** 47, 99 (2005).
48. F. Krzakala *Glassy properties of the Kawasaki dynamics of two-dimensional ferromagnets*, **Phys. Rev. Lett.** 94, 077204 (2005)
49. F. Krzakala, A. Pagnani and M. Weigt *Threshold values, stability analysis and high-q asymptotics for the coloring problem on random graphs*, **Phys. Rev. E** 70, 046705 (2004)
50. F. Krzakala *On temperature chaos in Ising and XY spin glasses*, **Europhys. Lett.** 66 (6), 847-853 (2004)
51. C. Godrèche, F. Krzakala and F. Ricci-Tersenghi *Nonequilibrium critical dynamics of the ferromagnetic Ising model with Kawasaki dynamics*, **J. Stat. Mech.: Theor. Exp.** (2004) P04007
52. F. Krzakala and G. Parisi *Local excitations in mean field spin glasses*, **Europhys. Lett.** 66 (5), 729-735 (2004)
53. J.P. Bouchaud, F. Krzakala and O.C. Martin, *Energy exponents and corrections to scaling in Ising spin glasses*, **Phys. Rev. B** 68, 224404 (2003)
54. F. Krzakala and O.C. Martin, *Absence of an equilibrium ferromagnetic spin glass phase in three dimensions*, **Phys. Rev. Lett.** 89, 267202 (2002)
55. M. Müller, F. Krzakala and M. Mézard, *The secondary structure of RNA under tension*, **Eur. Phys. J. E** 9, 67-77 (2002)
56. F. Krzakala and O.C. Martin, *Chaotic temperature dependence in a model of spin glasses*, **Eur. Phys. J. B**, 28 199-208 (2002)
57. F. Krzakala, M. Müller and M. Mézard, *Nature of the glassy phase of RNA secondary structure*, **Europhys. Lett.**, 57 (5), pp. 752-758 (2002)
58. F. Krzakala, J. Houdayer, E. Marinari, O.C. Martin and G. Parisi, *Zero-temperature responses of a 3D spin glass in a field*, **Phys. Rev. Lett.** 87, 197204 (2001)
59. F. Krzakala and O.C. Martin, *Discrete energy landscapes and replica symmetry breaking at zero temperature*, **Europhys. Letters** 53 (6) (2001) 749-755

60. J. Houdayer, F. Krzakala and O.C. Martin, *Large-scale low-energy excitations in 3-d spin glasses*, **Eur. Phys. J. B** 18, 467-477 (2000)
61. F. Krzakala and O.C. Martin, *Spin and link overlaps in 3-dimensional spin glasses*, **Phys. Rev. Lett.** 85, 3013 (2000)

Review article

1. L. Zdeborova and F. Krzakala *Statistical physics of inference: Thresholds and algorithms*, **Advances in Physics**, Advances in Physics Volume 65, 2016
2. V. Bapst, L. Foini, F. Krzakala, G. Semerjian, F. Zamponi, *The Quantum Adiabatic Algorithm applied to random optimization problems: the quantum spin glass perspective*. **Physics Reports** 523, 127 (2013)

Books and chapter contributions

1. F. Krzakala, F. Ricci-Tersenghi, E. Tramel, R. Zecchina, L. Zdeborová and L. Cugliandolo, *Statistical Physics, Optimization, Inference, and Message-Passing Algorithms* (Oxford University Publishing, 2014)
2. L. Berthier, V. Viasnoff, O. White, V. Orlyanchik and F. Krzakala, Chapter *Hiking through glassy phases: physics beyond aging* in *Slow relaxations and nonequilibrium dynamics in condensed matter*, editors: J.-L. Barrat, J. Dalibard, M. Feigelman, J. Kurchan (Springer, Berlin, 2003)

Conference proceedings

1. Jean Barbier, Mohamad Dia, Nicolas Macris, Florent Krzakala, *The Mutual Information in Random Linear Estimation*, **Communication, Control, and Computing (Allerton)**, 2016 54th Annual Allerton Conference on.
2. Jean Barbier, Mohamad Dia, Nicolas Macris, Florent Krzakala, Thibault Lesieur, Lenka Zdeborová, *Mutual information for symmetric rank-one matrix estimation: A proof of the replica formula*, Advances in Neural Information Processing Systems (NIPS) 28 (2016).
3. Eric W. Tramel, Andre Manoel, Francesco Caltagirone, Marylou Gabrié, Florent Krzakala, *Inferring Sparsity: Compressed Sensing using Generalized Restricted Boltzmann Machines*, IEEE Information Theory Workshop (ITW 2016)) **ITW 2016 Cambridge**.
4. Alaa Saade, Florent Krzakala, Marc Lelarge, Lenka Zdeborová, *Clustering from Sparse Pairwise Measurements*, Information Theory Proceedings (ISIT), 2016 IEEE International Symposium on.
5. Florent Krzakala, Jiaming Xu, Lenka Zdeborová, *Mutual Information in Rank-One Matrix Estimation*, IEEE Information Theory Workshop (ITW 2016)) **ITW 2016 Cambridge**.
6. Jean Barbier, Eric W. Tramel, Florent Krzakala, *Scampi: a robust approximate message-passing framework for compressive imaging*, Presented at the 2015 International Meeting on High-Dimensional Data Driven Science, Kyoto, Japan.
7. Alaa Saade, Francesco Caltagirone, Igor Carron, Laurent Daudet, Angélique Drémeau, Sylvain Gigan, Florent Krzakala, *Random Projections through multiple optical scattering: Approximating kernels at the speed of light*, Acoustics, Speech and Signal Processing (**ICASSP**), **2016 China** IEEE International Conference on.
8. Boshra Rajaei, Eric W. Tramel, Sylvain Gigan, Florent Krzakala, Laurent Daudet, *Intensity-only optical compressive imaging using a multiply scattering material: a*

- double phase retrieval system*, Acoustics, Speech and Signal Processing (**ICASSP**), **2016 China** IEEE International Conference on.
9. Maria Chiara Angelini, Francesco Caltagirone, Florent Krzakala, Lenka Zdeborová, *Spectral Detection on Sparse Hypergraphs*, **Communication, Control, and Computing (Allerton)**, **2015 53th Annual Allerton Conference on**.
 10. Thibault Lesieur, Florent Krzakala, Lenka Zdeborová, *MMSE of probabilistic low-rank matrix estimation: Universality with respect to the output channel*, **Communication, Control, and Computing (Allerton)**, **2015 53th Annual Allerton Conference on**.
 11. Alaa Saade, Florent Krzakala, Lenka Zdeborová, *Matrix Completion from Fewer Entries: Spectral Detectability and Rank Estimation*, Advances in Neural Information Processing Systems (NIPS) 28 (2015).
 12. Marylou Gabrié, Eric W. Tramel, Florent Krzakala, *Training Restricted Boltzmann Machines via the Thouless-Anderson-Palmer Free Energy*, Advances in Neural Information Processing Systems (NIPS) 28 (2015).
 13. Alaa Saade, Florent Krzakala, Marc Lelarge, Lenka Zdeborová, *Spectral Detection in the Censored Block Model*, Information Theory Proceedings (ISIT), 2015 IEEE International Symposium on.
 14. Andre Manoel, Florent Krzakala, Eric W. Tramel, Lenka Zdeborová, *Sparse Estimation with the Swept Approximated Message-Passing Algorithm*, International Machine Learning Conference (ICML) 2015
 15. Thibault Lesieur, Florent Krzakala and Lenka Zdeborová, *Phase Transitions in Sparse PCA*, Information Theory Proceedings (ISIT), 2014 IEEE International Symposium on.
 16. Angélique Drémeau, Florent Krzakala, *Phase recovery from a Bayesian point of view: the variational approach*, Acoustics, Speech and Signal Processing (**ICASSP**), **2015 vancouver** IEEE International Conference on.
 17. Jeremy Vila, Philip Schniter, Sundeep Rangan, Florent Krzakala, Lenka Zdeborová, *Adaptive Damping and Mean Removal for the Generalized Approximate Message Passing Algorithm*, Acoustics, Speech and Signal Processing (**ICASSP**), **2015 vancouver** IEEE International Conference on.
 18. Alaa Saade, Florent Krzakala, Lenka Zdeborová, *SSpectral Clustering of Graphs with the Bethe Hessian*, Advances in Neural Information Processing Systems (NIPS) 27 (2014).
 19. Jean Barbier, Florent Krzakala, *Replica Analysis and Approximate Message Passing Decoder for Superposition Codes*, Information Theory Proceedings (ISIT), 2014 IEEE International Symposium on, page(s) 1494 - 1498
 20. Florent Krzakala, Andre Manoel, Eric W. Tramel, Lenka Zdeborová, *Variational Free Energies for Compressed Sensing*, Information Theory Proceedings (ISIT), 2014 IEEE International Symposium on, page(s) 1499 - 1503.
 21. Francesco Caltagirone, Florent Krzakala, Lenka Zdeborová, *On Convergence of Approximate Message Passing*, Information Theory Proceedings (ISIT), 2014 IEEE International Symposium on, page(s) 1812-1816.
 22. C Schülke, F Caltagirone, F Krzakala and L Zdeborová, *Blind Calibration in Compressed Sensing using Message Passing Algorithms*, Advances in Neural Information Processing Systems (NIPS) 26 (2013).
 23. F. Krzakala and L. Zdeborová, *Performance of simulated annealing in p -spin glasses*, Proceeding of the **ELC International Meeting on "Inference, Computation, and Spin Glasses"** (**ICSG2013**), Sapporo, Japan. J. Phys.: Conf. Ser. 473 012022 (2013)

24. J. Barbier, F. Krzakala, L. Zdeborová and P. Zhang, *The hard-core model on random graphs revisited*, Proceeding of the **ELC International Meeting on "Inference, Computation, and Spin Glasses"** (ICSG2013), Sapporo, Japan. J. Phys.: Conf. Ser. 473 012021 (2013)
25. J. Barbier, F. Krzakala, L. Zdeborová and P. Zhang, *Robust error correction for real-valued signals via message-passing decoding and spatial coupling*, IEEE Information Theory Workshop (ITW 2013), 1-5 (2013) **ITW 2013 Sevilla**.
26. F. Krzakala, M. Mézard and L. Zdeborová, *Phase diagram and Approximate Message Passing for Blind Calibration and Dictionary Learning*, **Information Theory Proceedings (ISIT 2013, Istanbul)**, IEEE International Symposium on, page(s) 659 - 663 International Symposium Information Theory (ISIT) 2013, Istanbul.
27. P. Zhang, F. Krzakala, M. Mézard and L. Zdeborová, *Non-Adaptative pooling strategies for detection of rare faulty items* IEEE International Conference on Communications Workshops (**ICC 2013 Budapest**), Pages: 1409 - 1414, (2013)
28. F. Krzakala, M. Mezard and L. Zdeborová, *Compressed Sensing under Matrix Uncertainty: Optimum Thresholds and Robust Approximate Message Passing*, Acoustics, Speech and Signal Processing (**ICASSP**), **2013 vancouver** IEEE International Conference on, pages 5519 - 5523
29. J. Barbier, F. Krzakala, M. Mézard, L. Zdeborová *Compressed Sensing of Approximately-Sparse Signals: Phase Transitions and Optimal Reconstruction*, **Communication, Control, and Computing (Allerton)**, **2012 50th Annual Allerton Conference on**.
30. T. Jorg, F. Krzakala, J. Kurchan and A. C. Maggs *Quantum Annealing of Hard Problems*, **Proceedings of the "YKIS 2009 : Frontiers in Nonequilibrium Physics" conference** in Kyoto, August 2009. Progress of Theoretical Physics Supp. 184 (2010) 290-303
31. F. Krzakala and L. Zdeborová, *The Colorings of a Large Random Graph: From the Phase Diagram to Computational Hardness* **Proceedings of the International Workshop on Statistical-Mechanical Informatics** September 2007, Kyoto, Japan. J. Phys.: Conf. Ser. 95 012012
32. F. Krzakala and J. Kurchan, *Constraint optimization and landscapes* **Proceeding of the STAT PHYS 23** conference, June 2007, Genova, Italy. Eur. Phys. J. B 64, 563-565 (2008).
33. F. Krzakala and F. Ricci-Tersenghi, *Aging, memory and rejuvenation: some lessons from simple models*. **Proceeding of "Ageing and the Glass Transition" school**, Luxembourg (September 2005), J. Phys.: Conf. Ser. 40 42-49
34. F. Krzakala, *Zero temperature phase diagram of finite connectivity spin glasses* **Proceeding of StatPhys 22 satellite SPDSA 2004** (Tokyo, Japan), Progress of Theoretical Physics Supplement No.157 (2005) pp. 77-81
35. F. Krzakala, *How many color to color a graph? Cavity, Stability, Complexity and all that...*, **Proceeding of StatPhys 22 satellite SPDSA 2004** (Tokyo, Japan), Progress of Theoretical Physics Supplement No.157 (2005) pp. 357-360

Thesis and Habilitation

1. F. Krzakala *Aspects géométriques et paysage d'énergie des verres de spins*, Ph.D. thesis, Université Pierre et Marie Curie, PARIS VI (2002)
2. F. Krzakala *Quelques problèmes de physique statistique des systèmes désordonnés*, Habilitation thesis, Université Pierre et Marie Curie, PARIS VI (2011)

Conferences, schools, workshops and seminars

I have given about a hundred seminars at universities, conferences and workshops. In particular I was invited to give talks and colloquiums at major universities and research centers: Princeton, Harvard, MIT, Berkeley, Univ. of Chicago, Los Alamos Nat. Lab., ICTP Trieste, ETH Zurich, Santa Fe Institute, Tokyo Inst. of Technology, Rome etc. The complete list follows:

Cambridge September 2016, **talk** at the ITW 2016 conference

Aalborg (Denemark) July 2016, **invited Keynote Talk** at the International Traveling Workshop on Interactions Between Sparse Models and Technology ITWIST2016

Frankfurt (Germany) July 2016, **invited talk** at the workshop on Phase transitions in discrete structures at Goethe University.

Paris) July 2016, **invited talk** at the “journée Claude Shannon” at LINCOS and INRIA

Paris (IHP) Mai 2016, **invited talk** at the IHP Microsoft Workshop on “Community detection and Phase Transitions”

Berkeley (USA) Mai 2016, **invited talk** at the Workshop “Random phase transitions” at the Simons Institute.

NASA (USA) April 2016 **seminar** in the quantum group in Mountain View.

San Diego (USA) February 2016 **Talk** at Information Theory and Application workshop

Berkeley (USA) January 2016, **invited talk** at the Bootcamp on “phase transitions” at the Simons Institute.

GRETSI 2015, September invited Keynote Talk in Lyon.

Cargese (Corsica) September 2015, **2H invited lecture** at school on random graphes.

Harvard (USA) August 24 à 26, 2015, **invited talk** at the Conference on Big Data

Les Houches (France) June 2015, **12H invited lecture** at Physics school of Les Houches, for the International Doctoral Training in Statistical Physics 2015

Trieste (Italy) June 2015, **10H invited lecture** at the International Centre for Theoretical Physics, for the Spring College on the Physics of Complex Systems 2015

Paris ENS Mai 2015, **seminar** in the DI (computer Science department).

Cargese (France) Mai 2015, **invited seminar** at the workshop “Wave physics”

Paris (IT) February 2015, **invited talk** at the IHP Workshop “Community detection”

Berkeley (USA) February 2015, **invited talk** at the Workshop “Coding theory” at the Simons Institute

Bardinecchia (IT) February 2015, **invited talk** at the Workshop “Biological network”

Paris (IT) November 2014, **invited talk** at the IHP Workshop “random matrices”

MIT-Cambdrige (USA) August 2014, **seminar**

Boston (USA) Juin 2014, **talk** at the CCP 2014 conference

Honolulu (USA) June 2014, **talk** at the ISIT 2014 conference

Warwick EPSRC Symposium on Statistical Mechanics May 2014, **invited talk** in Phase transitions in discrete structures and computational problems.

Paris March 2014, **seminar** at Ecole Centrale.

NIPS 2013, lake Tahoe December 2013, **poster and proceeding**

Paris November 2013, **seminar** at the APC, Paris

Paris November 2013, **invited talk** at the GDR Phénix-ISIS “Analyse et inférence pour les réseaux”. Available on the web at ximinds.com

Gottingen November 2013, **invited talk** at the Workshop “Compressive Sensing”

Sevilla September 2013, **talk** at the ITW 2013 conference

Sappuro, Japan, July 2013, **invited talk** at International Meeting on “Inference, Computation, and Spin Glasses”

Seoul, Korea, July 2013, **talk** at the STATPHYS 25 conference

Lausanne June 2013, **talk** at the SPARS2013 conference in EPFL

Vancouver May 2013, **talk** at the ICASSP 2013 conference
New York May 2013, **seminar** at the physics institute in NYU.
Paris December 2012, **talk** at the Tomographic Reconstruction Workshop in Paris
Paris November 2012, **seminar** at the Institut de Simulation de Jussieu.
Oldenburg (Germany) November 2012, **seminar** in the physics department.
Rennes November 2012, **seminar** in INRIA.
Allerton October 2012, **talk** at the 50th Conference on Communication, Control, and Comp..
Aspen (CO USA), August 2012, Workshop in the Center of Physics. **seminar**
Los Alamos (NM USA), August 2012, **seminar**: Colloquium CNLS in Los Alamos LANL
Paris (France), Juin 2012, **invited public talk** at the *Journées "Complexité/désordre"*.
Paris (France), Juin 2012, **invited talk** at *Interdisciplinary Workshop on Inference*.
Paris (France), Juin 2012, **seminar** at Capital Fund Management.
Paris (France), May 2012, **invited talk** in IHP *Disordered Quantum Systems meeting*.
Nancy (France), May 2012, **invited talk** at SPLDS 2012.
Philips Research (France), April 2012, **seminar** at the Suresnes department.
Lyon (France), March 2012, **seminar** at the ENS Lyon.
Saclay (France), March 2012, **seminar** at the Service of Astrophysics.
Saclay (France), January 2012, **seminar** Triangle de la physique.
Paris (France), December 2011, **invited talk** at *Unifying concept in glass physics V*.
Paris (France), November 2011, **seminar** at ESPCI.
Rome (Italy), March 2011, **seminar** at University of Roma La Sapienza.
Bardonecchia (Italy), February 2011, **invited talk** at the *international workshop on Statistical physics of complexity, optimization, and systems biology*.
Tokyo, November 2010, **invited talk** at the workshop on complex system in Tokyo.
Harvard (USA), October 2010, **seminar** Squishy Physics talks.
Orsay (France), September 2010, workshop on *Statistical physics, complexity, optimization and biological information*, **talk**.
Hong Kong, July 2010, *STATPHYS 25: Complexity, Computation and Information*, **talk**.
Beijing (China), July 2010, *Beihang University*, **seminar**.
Beijing (China), July 2010, *STATPHYS 24 Satellite : Statistical Physics and Computer Science*, **invited talk**.
Trieste ICTP, June 2010, **invited talk** in the Workshop *Quantum Statistical Mechanics, Computation and Information*.
Saclay (France), Mai 2010, Ipht, groupe des systèmes vitreux **seminar**.
Los Alamos (NM USA), April 2010, Condensed matter group **seminar**.
Los Alamos (NM USA), April 2010, Quantum lunch **seminar**.
Trieste ICTP, November 2009 **seminar** in the Statistical Physics Group.
Barcelona, October 2009, **invited talk** at the *Workshop on Techniques and Challenges from Statistical Physics*
Chicago (USA), October 2009, **seminar** in the center of physics.
Santa Fe (NM USA), September 2009, **invited talk** at *Physics of algorithms*.
Los Alamos (NM USA), April 2009, **seminar** in (CNLS) Los Alamos Nat. Lab.
MIT Cambridge (USA), February 2009, **visiting scientist** in the Cent. Theor. Physics.
Amherst (USA), February 2009, **seminar** in the theoretical physics department of the University of Massachusetts Amherst.
Kyoto (Japan), November 2008, **invited talk** at the *Unifying concept in glass physics*.
Kyoto (Japan), November 2008, **talk** in the French-Japan meeting at the Yukawa Institute.
Los Alamos (NM USA), October 2008, **seminar** in Los Alamos Nat. Lab.
Santa Fe (NM USA), October 2008, **seminar** in the Santa Fe Institute.
Princeton (NJ USA), October 2008, **seminar** in the center of physics
Rutgers University (NJ USA), October 2008, **invited talk** in the DIMACS workshop.
Los Alamos (NM USA), October 2008, **seminar** in Los Alamos Nat. Lab.

Aspen (CO USA), June 2008, Workshop in the Center of Physics.
Los Alamos (NM USA), May 2008, **seminar** in Los Alamos Nat. Lab.
Stockholm(Sweden), May 2008, *Workshop on Physics and Computation*, **invited talk**.
Beijing(China), March 2008, *Workshop on Collective Dynamics of information System*, **invited lecture**.
Braga(Portugal), November 2007, *Workshop on complex network*, **invited talk**.
Kyoto(Japan), September 2007, *International Workshop on Statistical-Mechanical Informatics*, **invited talk**.
Genova, July 2007, *STATPHYS 23*, **poster**
Paris, June 2007, *Summer school on Spin Glasses 2007*, **invited lecture**.
Zurich, April 2007, **ETH Theory Seminar** in ETH Zurich.
Lyon, March 2007, **seminar** at ENS.
Paris, January 2007, *Journées de Physique Statistique 2007*, at ESPCI, **talk**.
Torino, January 2007, **seminar** in the at ISI.
Koln, July 2006, **seminar** in the physics department.
Paris, January 2006, *Journées de Physique Statistique 2006q*, at ESPCI, **talk**.
Lyon, November 2005, CECAM Tutorial on polymers and colloids
Luxembourg, September 2005, School on aging and glassy dynamics, **talk+proceedings**.
Leuven, ITF, September 2005, Random Graph 2005, **invited talk**.
Lyon, CECAM, April 2005, Conference on Monte-Carlo Methods, **talk**.
Roma, Universita *La Sapienza*, March 2005, **seminar**.
Les Houches, February 2005 *Winter School on complex system*.
Trieste (Italie), september 2004 *Complex system meeting*, **talk**.
Tokyo (Japan), July 2004 *STATPHYS22 Satelite meeting*, **talk**.
Bangalore (India), June 2004 *Unifying concept in glass physics* **invited talk**.
Nancy, May 2004 *Workshop on Ageing and slow dynamics*, **talk**.
Paris, May 2004, **seminar** at ESPCI PCT.
Rome, La Sapienza, March 2004, **seminar**.
Paris, Saclay, CEA Spht, January 2004, CEA Spht, **seminar**.
Paris, Orsay, LPT, January 2004, LPT and LPTMS, **seminar**.
Cagliari (Italia), September 2003, *General SPHINX Meeting*, **talk**.
Salerno, May 2003, Physics department, **seminar**.
Paris, LPTL, May 2003, **seminar**.
Napoli, April 2003, Physics department, **seminar**.
Saarbrücken, MECO 28, March 2003, **talk**.
Montpellier, March 2003, **seminar** at laboratoire des verres.
Les Houches, March 2003 *School on complexity*, **talk**.
Rome Complexity meeting, September 2002, **poster**.
Marseille JMC8, August 2002 *Journée de la matière condensée*, **talk**.
Les Houches, July 2002 *Summer school on theoretical physics of aging*, **poster+proceedings**.
Rome SMC, February 2002 *Unifying concept in glass physics II*, **poster**.
Paris, February 2002, **seminar** at ESPCI PCT.
Paris, January 2002, *Journées de Physique Statistique 2002*, at ESPCI, **talk**.
Barcelona, December 2001, **seminar** at *Departament de Fisica Fonamental*.
Orsay, September 2001, **seminar** at LPTMS.
Il Ciocco (Italia), September 2001, *General SPHINX Meeting*, **talk**.
Montpellier, January 2001, *Structure et Dynamique des systèmes désordonnés*, **poster**.
Saclay, June 2000, *The Fifth Claude Itzykson Meeting*, **poster**.
Orsay, April 2000, **seminar** at LPTMS.
Nancy, February 2000, 25 MECO Meeting, **poster**.
Paris, February 2000, *Journées de physique statistique 2000*, **talk**.
Trieste ICTP, September 1999 *Unifying concept in glass physics*.

Undergraduate Teaching activities

2016 - ...	Wave physics, 24h exercice	UPMC, Paris
2013 - ...	Statistical physics, 64h Lecture	ENS Cachan
2013 - ...	Physics 101, 64h TD	UPMC, Paris
2004-2012	Scientific programming, 180h/year TP	ESPCI, Paris
2010-2013	Quantum Mechanics, 24h/year TD	ESPCI, Paris
2005-2008	Statistical Physics, 16h/year TD	ESPCI, Paris
2006-2008 2010-2013	Mathematics, 38h/year TD	ESPCI, Paris
2005-2007	Introduction to numerical methods, 20h/year	Jussieu, Paris
2001-2002	Introduction to numerical methods, 36h TD	ASSAS Paris
VII-2002	Modern physics for technicians, 10h	EDF
2000-2001	Introduction to numerical method, 42h TD/TP	Orsay, Paris
X-2002	Modern physics for technicians,	EDF
V-2000	<i>Colles de Physique</i> 10h	Jussieu, Paris
1999-2000	Modern physics for technicians, 36h TD/TP	Orsay, Paris

Graduate Teaching activities

2016-....	<i>Statistical Physics and Monte-Carlo Simulations</i>	Paris
2014-.... Cours d'école doctorale	<i>Statistical Physics of Bayesian Inference</i> 12h	Paris (2014) Trieste (2015)
2011-....	<i>Advanced simulation techniques and mathematical tools</i> en Master international 18h	Paris
2010	<i>Statistical physics on random graphs</i> in TokyoTech, 9H	Tokyo, Japan
2010-....	<i>Optimisation et physique statistique</i> en Master MSC, 6H	Lyon

Curent Students and Post-docs

Postdocs	Eric Tramel (<i>ERC SPARCS</i>) Andre Manoel (<i>ERC SPARCS</i>)
Ph.D students	Marylou Gabriele (2015-...)

Former Students and Post-docs

Postdocs	Francesco Caltagirone (2015), now researcher in INRIA Paris (France) Pan Zhang (2012), now associate professor (China) Angelique Dreameau (2013-2014), now associate professor (France)
Ph.D (2013-2016) (2012-2015) (2012-2015) (2011)	Alaa Saade, now in SNIPS S.A. Paris Jean Barbier, now post-doc in EPFL Lausannes (Swiss) Christophe Schulle, now at Phillips Research, Hamburg (Germany) Sun Yifan (2011), now lecturer in Renmin University of China

Conference and workshop organization

- 11 July-16 July 2016 : *Statistical physics methods in biology and computer science*, satellite of StatPhys2016, in Ecole Normale, Paris
- 26 August-7 September 2014 : *Spin glasses and beyond*, Cargese, Corsica
- 30 September-11 October 2013 : *School on Statistical physics, optimization, inference and message passing algorithms*, Les Houches
- 19-24 February 2012 : *Bridging statistical physics and optimization, inference and learning*, Les Houches
- 7-10 December 2011 : *French-Japanese workshop on disordered systems and the Jamming Transition*, IHP Paris
- 14-17 June 2011: Conference on *Physics and Biological Systems*, Orsay
- 13-15 September 2010: Workshop on *Statistical Physics of Complexity, Optimization and Biological information*, Orsay
- 7-12 March 2010 : Les Houches, *School and workshop on Statistical Physics of Complexity, Optimization and Biological information*, Les Houches
- 8-9 October 2009 : PEPS workshop, *Statistical Physics And New Algorithms for Optimization and Inference*, LPTMS, Orsay

Funding ID

- **ERC** “Consolidator grant” from EU 2012-2017 SPARCS 307087.
- **PSL - Structuration d'équipes**, 2014-2015 avec Laurent Daudet et Sylvain Gigan.
- **ANR Jeune Chercheur JCJC** awarded in 2012.
- September 2011 - September 2012: “Projet d'intéret majeur de l'institut des systèmes complexes Paris d'Ile de France” **ISC Paris** on Bayesian Inference of Functional Modules in a Network. (Post-Doc Pan Zhang, 2012).
- Bourse de these **DGA** (Ph.d Jean Barbier, 2012-2015)
- Bourse de these en co-tutelle **Université Franco-Italienne** (Ph.d C. Schulke, 2012-2015)
- September 2009 - September 2010: **MIT-France** Seed Fund grant for Numerical Simulation and Quantum Adiabatic Algorithm in collaboration with the MIT Group in Boston (USA).

Referring activity I have referred scientific articles for: *Phys. Rev. Lett.*, *Proc. Nat. Acad. Sci.*, *Phys. Rev. B*, *Phys. Rev. E*, *Europhys. Lett*, *Euro. Phys. J B*, *Euro. Phys. J E*, *J. Stat. Mech.*, *J. Stat. Phys.*, *J. Phys. A*, *Journal of Physics: Conference Series* and *Physics Letters A*.

I have also served as a referee for conferences in Neural Information Processing Systems (NIPS), the International Symposium on Information Theory (ISIT), RANDOM, as well as for grant evaluation for the ANR and the ERC.