Final report on the Workshop on Random Interacting Systems

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University of Bath, June 23–27, 2014

1 Summary

The workshop was organized by Alexandre Stauffer (University of Bath) and Vladas Sidoravicius, and took place at the University of Bath, U.K., from 23rd June 2014 to 27th June 2014. The workshop put together leading researchers and prominent students from all over the world (including the U.K., other European countries, Brazil, Chile, USA and Singapore) working on various sub-fields of *random interacting systems*. The meeting comprised two mini-courses, 12 invited talks and 13 contributed talks by participants. There were a total of 76 participants, including 14 invited speakers, 33 students, 12 post-docs and 17 faculty members.

2 Scientific Content

The main focus of the meeting was on new developments in the various sub-fields of *random interacting systems*, covering areas such as interacting and self-interacting particle systems, random walks and other stochastic processes in random environments, random and evolving graphs, random interlacements, Gaussian free field, random polymers, percolation and spin systems.

The activities of the workshop consisted of two mini-courses of 4 lectures each, by Christophe Garban (ENS, Lyon) and Hugo Duminil-Copin (University of Geneva), 12 invited talks by leading researchers in the area of random interacting systems, and 13 contributed talks by participants. In addition, there were plenty of time in between the talks for further discussion and collaboration among the participants.

Mini courses

The goal of the mini-courses was to give an accessible introduction to new emerging areas of research. The mini-course of Hugo Duminil-Copin was about the analysis of low-dimensional lattice spin systems, such as the Potts model, $O(n)$ model and Ising model. In this mini-course, Hugo explained three different representations of spin systems: (i) random-cluster model, (ii) loop $O(n)$ model, and (iii) random cluster representation. Each of these representations was then used to analyze a different aspect (for example, one of these aspects was the so-called magnetization) of the aforementioned models at criticality. Particular attention was given to analyze whether a phase transition exists and whether the phase transition is continuous or not.

The mini-course of Christophe Garban was about Liouville quantum gravity and multiplicative chaos theory. In this mini-course, Christophe started by motivating the study of quantum gravity and the KPZ formula. After that, he introduced the theory of multiplicative chaos, and used it to construct the so-called exponential of the Gaussian free field. Then he turned to discuss possible frameworks for a KPZ formula.

Invited talks

The invited talks were intended to discuss new results in more depth, and covered other models of random interacting systems beyond those in the mini-courses, including random polymers (Kenneth Alexander, Nadine Guillotin-Plantard, Neil O'Connell and Rongfeng Sun), random walks in random environments (Frank den Hollander and Alejandro Ramirez), interacting and self-interacting random walks (Nathanael Berestycki, Pierre Tarres, and Augusto Teixeira), random surfaces (Ron Peled, Yvan Velenik), and properties of the trace of random walks (Perla Sousi). Below are the details of each invited talk.

KENNETH ALEXANDER *Polymer pinning with sparse disorder.*
The standard setup in disordered pinning models is that a polymer configuration is modeled by the trajectory of a Markov chain which is rewarded or penalized by an amount ω_n when it returns to a special state 0 at time n. More precisely, for a polymer of length N the Boltzmann weight is $e^{\beta H}$, where for a trajectory $\tau, H(\tau)$ is the sum of the values ω_n at the times $n \leq N$ of the returns to 0 of τ. Typically the ω_n are taken to be a quenched realization of a iid sequence, but here we consider the case of sparse disorder: ω_n is 1 at the returns times of a quenched realization of a renewal sequence $\{\sigma_j\}$, and 0 otherwise; in the interesting cases the gaps between renewals have infinite mean, and we assume the gaps have a regularly varying power-law tail. For β above a critical point, the polymer is pinned in the sense that τ asymptotically hits a positive fraction of the N renewals in σ. To see the effect of the disorder one can compare this critical point to the one in the corresponding annealed system. We establish equality or inequality of these critical points depending on the tail exponents of the two renewal sequences (that is, σ and the return times of τ.) This is joint work with Quentin Berger.

NATHANAEL BERESTYCKI *Condensation of a random walk model for the Wulff crystal.*
I will introduce a Gibbs measure on nearest-neighbour paths of length t in the Euclidean d-dimensional lattice, where each path is penalized by a factor proportional to the size of its boundary and an inverse temperature β. The resulting random shape can be thought of as a random walk model for the Wulff crystal, representing the distribution of a diluted polymer in a poor solvent. It is proved that, with high probability, for all $\beta > 0$, the random walk condensates to a set of diameter $t^{1/3}$ in dimension $d = 2$, up to a multiplicative constant. Analogous (though slightly less precise) results are obtained in higher dimensions. Joint work with Ariel Yadin.

NADINE GUILLOTIN-PLANTARD *Quenched limiting distributions of a charged-polymer model.*
We will discuss quenched limiting distributions of the Hamiltonian of the so-called charged polymer model introduced by Kantor and Kardar [1] in the case of Bernoulli random charges and Derrida, Griffiths and Higgs [2] in the Gaussian case. (Joint work with Renato Soares Dos Santos).

1. Kantor, Y., Kardar, M. (1991) Polymers with Random Self-Interactions. Europhys. Lett., 14 (5), 421 - 426.
2. Derrida, B., Griffiths, B. and Higgs, P.G.(1992) A Model of Directed Walks with Random Self-Interactions. Europhys. Lett. 18, 361-366.

FRANK DEN HOLLANDER *Random Walk in Dynamic Random Environment.*
In this talk I start with a brief outline of the main challenges for random walk in dynamic random environment. After that I describe a one-dimensional example where the dynamic random environment consists of a collection of particles performing independent simple random walks in a Poisson equilibrium with density $\rho \in (0, \infty)$. At each step the random walk moves to the right with probability $p_\circ$ when it is on a vacant site and probability $p_\bullet$ when it is on an occupied site. I

show that when $p_\circ \in (0,1)$ and $p_\bullet \neq \frac{1}{2}$, the position of the random walk satisfies a strong law of large numbers, a functional central limit theorem and a large deviation bound, provided ρ is large enough. The proof is based on the construction of approximate regeneration times, together with a multiscale renormalisation argument. Joint work with M. Hilario, R. dos Santos, V. Sidoravicius and A. Teixeira.

Neil O'Connell *Geometric RSK, Whittaker functions and random polymers.*
The Robinson-Schensted-Knuth (RSK) correspondence is a combinatorial bijection which plays an important role in the theory of Young tableaux and provides a natural framework for the study of last passage percolation and longest increasing subsequence problems. In this talk I will explain how a 'geometric' (or 'de-tropicalized') version of the RSK mapping provides a similar framework for the study of Whittaker functions and random polymers, mainly based on recent joint works with Ivan Corwin, Timo Seppalainen and Nikos Zygouras.

Ron Peled *Delocalisation of two-dimensional random surfaces with hard-core constraints.*
We study the fluctuations of random surfaces on a two-dimensional discrete torus. The random surfaces we consider are defined via a nearest-neighbor pair potential which we require to be twice continuously differentiable on a (possibly infinite) interval and infinity outside of this interval. No convexity assumption is made and we include the case of the so-called hammock potential, when the random surface is uniformly chosen from the set of all surfaces satisfying a Lipschitz constraint. Our main result is that these surfaces delocalise, having fluctuations whose variance is at least of order log n, where n is the side length of the torus. We also show that the expected maximum of such surfaces is of order at least log n. The main tool in our analysis is an adaptation to the lattice setting of an algorithm of Richthammer, who developed a variant of a Mermin-Wagner-type argument applicable to hard-core constraints. We rely also on the reflection positivity of the random surface model. The result answers a question mentioned by Brascamp, Lieb and Lebowitz on the hammock potential and a question of Velenik. Joint work with Piotr Milos.

Alejandro Ramírez *Almost exponential decay for the exit probability from slabs of ballistic RWRE.*
It is conjectured that in dimensions $d \geq 2$ any random walk (X_n) in an i.i.d. uniformly elliptic random environment (RWRE) which is directionally transient ($\lim_{n\to\infty} X_n \cdot l = \infty$ for some direction l) is ballistic ($\lim_{n\to\infty} X_n \cdot l/n > 0$). The ballisticity conditions for RWRE somehow interpolate between directional transience and ballisticity and have served to quantify the gap which would need to be proven in order to answer afirmatively this conjecture. Two important ballisticity conditions introduced by Sznitman in 2001 and 2002 are the so called conditions (T') and (T): given a slab of width L orthogonal to l, condition (T') in direction l is the requirement that the annealed exit probability of the walk through the side of the slab in the half-space $\{x : x \cdot l < 0\}$, decays faster than e^{-CL^γ} for all $\gamma \in (0,1)$ and some constant $C > 0$, while condition (T) in direction l is the requirement that the decay is exponential in e^{-CL}. It is believed that (T') implies (T). Here I will show that (T') implies at least an almost (in a sense to be made precise in the talk) exponential decay. This talk is based on joint work with Enrique Guerra from Universidad Católica de Chile.

Perla Sousi *Uniformity of the late points of random walk on Z_n^d for $d \geq 3$.*
Let X be a simple random walk in Z_n^d and let t_{cov} be the expected amount of time it takes for X to visit all of the vertices of Z_n^d. For $\alpha \in (0,1)$, the set L_a of α-late points consists of those $x \in Z_n^d$ which are visited for the first time by X after time αt_{cov}. Oliveira and Prata (2011) showed that the distribution of L_1 is close in total variation to a uniformly random set. The value $\alpha = 1$ is

special, because $|L_1|$ is of order 1 uniformly in n, while for $\alpha < 1$ the size of L_α is of order $n^{d-\alpha d}$. In joint work with Jason Miller we study the structure of L_α for values of $\alpha < 1$. In particular we show that there exist $\alpha_0 < \alpha_1 \in (0,1)$ such that for all $\alpha > \alpha_1$ the set L_α looks uniformly random, while for $\alpha < \alpha_0$ it does not (in the total variation sense). In this talk I will try to explain the main ideas of our proof and what are the next steps in this direction.

Rongfeng Sun *Polynomial chaos and scaling limits of disordered systems.*
Inspired by recent work of Alberts, Khanin and Quastel, we formulate general conditions ensuring that a sequence of multi-linear polynomials of independent random variables (called polynomial chaos expansions) converges to a limiting random variable, given by an explicit Wiener chaos expansion over the d-dimensional white noise. A key ingredient in our approach is a Lindeberg principle for polynomial chaos expansions, which extends earlier work of Mossel, O'Donnell and Oleszkiewicz. These results provide a unified framework to study the continuum and weak disorder scaling limits of statistical mechanics systems that are disorder relevant, including the disordered pinning model, the long-range directed polymer model in dimension 1+1, and the two-dimensional random field Ising model. This gives a new perspective in the study of disorder relevance, and leads to interesting new continuum models that warrant further studies. This is based on joint work with F. Caravenna and N. Zygouras.

Pierre Tarrès *Edge-Reinforced Random Walk, Vertex-Reinforced Jump Process and the generalised Ray-Knight theorem.*
We will present a new proof of the Ray-Knight second generalised theorem. The argument is based on a martingale that can be seen as the Random-Nikodym derivative of a "magnetised" version of the reversed Vertex-Reinforced Jump Process (VRJP). The VRJP was proposed by Werner in 2000, initially studied by Davis and Volkov (2002, 2004), and is closely linked to the Edge-Reinforced Random Walk introduced by Diaconis in 1986. (joint with C. Sabot)

Augusto Teixeira *Adsorption phase for activated random walks.*
On the d-dimensional lattice, we consider a system with two types of particles (A and B), which is governed by the following rules. Particles of type A perform independent, continuous time simple random walks until they turn into B-particles, which happens at rate r. While at state B particles do not move at all, simply waiting to be 'awakened' by some walker of type A. More precisely, whenever two or more particles share a site they all turn into A-type immediately. In this talk we will comment on a recent work, proving that for any dimensions, this system gets adsorbed if the initial configuration has low enough density. We will give a brief overview of the proof, which shows that for such low densities the particles organize themselves into hierarchical cities of B-particles, reaching a stable configuration. This settles the conjectured phase transition for this model.

Yvan Velenik *Scaling limit of a layer of unstable phase.*
I'll present recent results obtained in collaboration with Dmitry Ioffe and Senya Shlosman. We are considering a class of $(1+1)$-dimensional effective interface models describing the equilibrium properties of a layer of unstable phase. Our main result provides a derivation of the scaling limits of these effective models as the system approaches phase coexistence. These scaling limits are given by stationary, ergodic, reversible diffusions with drifts given by the logarithmic derivative of the ground state of associated singular Sturm-Liouville operators. In the special case of a log-Airy drift, a diffusion of this type was obtained by Ferrari and Spohn in the context of Brownian bridges conditioned to stay above parabolic or circular barriers.

Contributed talks

Participants were given the opportunity to present their own research via short, contributed talks. Some contributed talks discussed other aspects of models that were also discussed during the mini-courses and invited talks, such as the Gaussian free field, the $O(n)$ and Ising models and activated random walks. Other contributed talks discussed other models of random interacting systems, including percolation and first-passage percolation, Abelian sandpiles, random interlacements and loop soups. Below are the details of each contributed talk.

Daniel Ahlberg *Inhomogeneous first-passage percolation.*
Consider first-passage percolation where edges in the left and right half-planes are assigned values according to different distributions. It is now no longer immediate from the Subadditive Ergodic Theorem that the resulting inhomogeneous first-passage process obeys a shape theorem. We present an alternative approach to show that a shape theorem indeed holds, and we express the limiting shape in terms of the limiting shapes for the homogeneous processes for the two weight distributions. A remarkable feature of the inhomogeneous model is that there exist pairs of distributions for which the rate of growth in the vertical direction is strictly larger than the rate of growth of the homogeneous process with either of the two distributions, and that this corresponds to the creation of a defect along the vertical axis in the form of a 'pyramid'.

Márton Balázs *Electric network for non-reversible Markov chains.*
There is a well-known analogy between reversible Markov chains and electric networks: the probability of reaching one state before another agrees with voltages in a corresponding network of resistances, and the electric current also has a probabilistic interpretation. Such analogies can be used to prove a variety of theorems regarding transience-recurrence, commute times, cover times. The electric counterpart is very simple, consists of resistors only. These simple components behave in a symmetric fashion, that's why the analogy only works for reversible chains. We found the electric component that allows to extend the above analogy from reversible Markov chains to irreversible ones. I will describe this new component, show how the analogy works, demonstrate some arguments that can be saved from the reversible case. I will also show how Rayleigh's monotonicity principle fails in our case, and interpret a recent non-reversible result of Gaudillière and Landim on the Dirichlet and Thomson variational principles in the electrical language. (Joint work with Áron Folly)

Alessandra Cipriani *Thick points for generalized Gaussian fields with different cut-offs.*
In this talk we would like to present a result on the Hausdorff dimension of the so-called a-thick points for generalized Gaussian fields with logarithmically diverging variance. Such fields are not functions, but distributions, hence it is useful to approximate them by suitable cut-off random variables. The choice for cut-offs is rather broad, hence we would like to understand under which assumptions the Hausdorff dimension is universal. We will show that the dimension equals $d - a^2/2$ as predicted by Kahane's theory of Gaussian multiplicative chaos, and we will try to explain how our result complements the ones obtained by Kahane, Hu-Miller-Peres and Rhodes-Vargas in the context of Gaussian multiplicative chaos and the $2-d$ Gaussian Free Field. This is a joint work with Rajat Subhra Hazra.

Sander Dommers *Ising critical exponents on random graphs.*
We study the ferromagnetic Ising model on random graphs with a prescribed degree distribution. We focus especially on power-law degree distributions, i.e., when the fraction of vertices with degree k decays like $k^-\tau$. If the mean degree is finite (degree exponent $\tau > 2$), then the random

graph has a tree-like structure. We use this observation to identify the thermodynamic limit of the magnetization. We then derive the critical temperature and the critical exponents of the magnetization for this model. We show that these exponents take their mean field values when the fourth moment of the degree distribution is finite ($\tau > 5$), but take different values for 3.

ALEXANDER GLAZMAN *Discretization of the stress-energy tensor as a new observable for $O(n)$ model.*
We consider a loop representation of O(n) model on the hexagonal lattice. One can insert several conical singularities and take the derivative in the angle. This gives an observable satisfying some particular local relations for any n from 0 to 2. For the Ising model ($n = 1$) with Dobrushin boundary conditions, we prove that this observable converges to ($\phi'^2 + 1/24 * S\phi$), where ϕ is the uniformizing map and S is the Schwarzian.

ANTAL JARAI *Avalanche size exponent for sandpiles on Galton-Watson trees.*
We study the abelian sandpile model on supercritical Galton-Watson trees under certain restrictions on the offspring distribution. We give upper and lower bounds on the tail of the distribution of the avalanche size establishing a mean-field exponent. The main tool we use is the conductance martingale introduced by Morris (2003) and further studied by Lyons, Morris & Schramm (2008). (Joint work with W. Ruszel and E. Saada)

DANIEL LANOUE *The Metric Coalescent.*
The Metric Coalescent (MC) is a measure valued Markov Process generalizing the classical Kingman Coalescent. We show how the MC arises naturally from a class of agent based models of social dynamics and prove an existence and uniqueness theorem extending the MC to the space of all Borel probability measures on any locally compact Polish space.

XINYI LI *A lower bound for disconnection by random interlacements.*
The talk will be divided into two parts. In the first part, we give a brief introduction to the model of random interlacements, introduced by A.-S. Sznitman in (Ann. Math. vol. 171, pp. 2039-2087). One can consider random interlacements intuitively as the trace of a Poissonian "cloud" of doubly-infinite nearest-neighbour paths on certain weighted graphs, governed by an intensity parameter. The vacant set, defined as the complement of the interlacements, undergoes a non-trivial phase transition with respect to percolative properties. In the second part, we investigate the asymptotic behaviour of the probability that a large body gets disconnected from infinity by the random interlacements on $Z^d, d = 3$, in the percolative regime of the vacant set. Motivated by an application of large deviation principles recently obtained in (arXiv:1304.7477) for the occupation-time profile of random interlacements, we derive an asymptotic lower bound, which brings into play a new version of random interlacements by which a stochastic "fence" is created to accomplish disconnection.

TITUS LUPU *From loop clusters and random interlacement to the free field.*
To a transient symmetric Markov jump process on a network is naturally associated an infinite measure on loops and the Poisson point process of loops of intensity proportional to this measure are sometimes called "loop soups". We focus on the "loop soup" of parameter 1/2 and construct a coupling between the Poisson ensemble of loops and the Gaussian free field on the network satisfying two constraints. First of all half the square of the free field must be the occupation field of the loops. Besides that the sign of the free field must be constant on clusters of loops. This is an improvement over the relation between the Poisson ensemble of loops and the Gaussian free field

obtained by Le Jan, which did not take in account the sign of of the free field. As a consequence of our coupling we deduce that loop clusters at parameter 1/2 do not percolate on periodic lattices. We also show that in dimension 3 or higher there is a coupling between the random interlacement of level u and the massless free field such that all trajectories are contained in the level set where the free field is greater than $-\sqrt{2u}$. Both in case of loops and of interlacements the couplings rely on the isomorphism theorems applied on metric graphs, where the discrete edges are replaced by continuous intervals.

IOAN MANOLESCU *Planar lattices do not recover from forest fires.*
Self-destructive percolation with parameters p, δ is obtained by taking a site percolation configuration with parameter p, closing all sites belonging to the infinite cluster, then opening every site with probability δ, independently of the rest. Call $\theta(p, \delta)$ the probability that the origin is in an infinite cluster in the configuration thus obtained. For two dimensional lattices, we show the existence of $\delta > 0$ such that, for any $p > p_c$, $\theta(p, \delta) = 0$. This proves a conjecture of van den Berg and Brouwer, who introduced the model. Our results also imply the non-existence of the infinite parameter forest-fire model.

PIERRE-FRAN COIS RODRIGUEZ *On level-set percolation for the Gaussian free field in high dimensions.*
We consider the Gaussian free field on the d-dimensional lattice, and investigate percolation of its level sets above a given height h. It has recently been shown that, as h varies, this model exhibits a non-trivial percolation phase transition in all dimensions d greater or equal to 3. We show that the associated critical density behaves like $1/d^{1+o(1)}$ as d goes to infinity. The proof gives the (principal) asymptotics of the corresponding critical height $h_*(d)$. Moreover, it shows that a related parameter $h_{**}(d)$, which characterizes a strongly subcritical regime, is in fact asymptotically equivalent to $h_*(d)$.

LORENZO TAGGI *Upper bound for the critical density of biased Activated Random Walk.*
We provide a new upper bound for the critical density of Activated Random Walk in case of biased distribution of jumps. With finite sleeping rate the bound is strictly less than one in one dimension for all initial particles distribution and in higher dimension for some initial particles distributions. This answers a question from Dickman, Rolla and Sidoravicius (2010) in case of bias.

MINMIN WANG *Cutting down trees and the reverse problem.*
Let T_n be a uniform tree of n nodes. We consider the following fragmentation process on T_n: choose a uniform vertex and, by removing it, split the tree into several components; repeat this procedure for each component until all the vertices have been picked. We define a "cut-tree" which describes the genealogy of this process and we show that there is a simple backward transformation which "recovers" the initial tree from the cut-tree, so that a tree and its cut-tree appear as dual with respect to the transformation. It is well-known that when n tends to infinity, the tree T_n, when properly rescaled, converges to the Brownian CRT T, which is a "tree-like" metric space encoded by the normalized Brownian excursion. Then the sequence of the cut-trees, properly rescaled, converges to another Brownian CRT, denoted by cut(T), which describes the genealogy of the homogeneous fragmentation process on T. Analogous to the discrete case, we find a procedure which permits us to discover the initial tree T from cut(T).

3 Assessment of the results

The workshop was a big success, providing an excellent environment for the exchange of ideas, presentation of new developments, and discussion of open research questions. The two mini courses gave a unique opportunity for participants to become familiar with the areas of quantum gravity and multiplicative chaos theory, and with the techniques in the analysis of spin systems at criticality.

The workshop was attended by a large number of participants, in particular Ph.D. students, post-docs and young researchers. They had the opportunity to know more about recent developments in the field of random interacting systems, and to discuss with leading researchers in the area. Besides, they had the opportunity to give contributed talks to advertise their own research.

4 Programme

Monday, 23rd June 2014.

9:00 – 10:15 Christophe Garban (ENS Lyon)
Lectures around Liouville quantum gravity and multiplicative Chaos theory

10:15 – 10:40 Coffee break

10:40 – 11:30 Pierre Tarrès (University of Oxford)
Edge-Reinforced Random Walk, Vertex-Reinforced Jump Process and the generalised Ray-Knight theorem

11:30 – 11:40 Short Break

11:40 – 12:25 Contributed talk session:

Alessandra Cipriani (Weierstrass Institut, Berlin)
Thick points for generalized Gaussian fields with different cut-offs

Daniel Ahlberg (IMPA)
Inhomogeneous first-passage percolation

Ioan Manolescu (University of Geneva)
Planar lattices do not recover from forest fires

12:25 – 13:45 Lunch

13:45 – 15:00 Hugo Duminil-Copin (Universitè de Genève)
Geometric representations of low-dimensional lattice spin systems

15:00 – 15:20 Coffee Break

15:20 – 16:10 Nathanael Berestycki (University of Cambridge)
Condensation of a random walk model for the Wulff crystal

16:10 – 17:00 Yvan Velenik (Universitè de Genève)
Scaling limit of a layer of unstable phase

Tuesday, 24th June 2014.

9:00 – 10:15 Hugo Duminil-Copin (Universitè de Genève)
Geometric representations of low-dimensional lattice spin systems

10:15 – 10:40 Coffee break

10:40 – 11:55 Christophe Garban (ENS Lyon)
Lectures around Liouville quantum gravity and multiplicative Chaos theory

11:55 – 12:05 Short Break

12:05 – 12:50 Contributed talk session:
Lorenzo Taggi (Max Planck Institute, Leipzig)
Upper bound for the critical density of biased Activated Random Walk

Minmin Wang (LPMA, UPMC, Paris)
Cutting down trees and the reverse problem

Sander Dommers (Università di Bologna)
Ising critical exponents on random graphs

12:50 – 14:10 Lunch

14:10 – 15:00 Alejandro Ramírez (Pontificia Universidad Católica de Chile)
Almost exponential decay for the exit probability from slabs of ballistic RWRE

15:00 – 15:50 Augusto Teixeira (IMPA)
Adsorption phase for activated random walks

15:50 – 16:10 Coffee Break

16:10 – 17:00 Rongfeng Sun (National University of Singapore)
Polynomial chaos and scaling limits of disordered systems

Wednesday, 25th June 2014.

9:00 – 9:50 Frank den Hollander (Universiteit Leiden)
Random Walk in Dynamic Random Environment

9:50 – 10:40 Nadine Guillotin-Plantard (Université Lyon 1)
Quenched limiting distributions of a charged-polymer model

10:40 – 11:05 Cofee Break

11:05 – 12:05 Contributed talk session:
Pierre-Franois Rodriguez (ETH Zurich)
On level-set percolation for the Gaussian free field in high dimensions

Titus Lupu (Universit Paris Sud)
From loop clusters and random interlacement to the free field

Xinyi Li (ETH Zurich)
A lower bound for disconnection by random interlacements

Daniel Lanoue (UC Berkeley)
The metric coalescent

12:05 – 12:15 Short Break

12:15 – 13:05 Neil O'Connell (University of Warwick/Trinity College Dublin)
Geometric RSK, Whittaker functions and random polymers

Thursday, 26th June 2014.

9:00 – 10:15 Christophe Garban (ENS Lyon)
Lectures around Liouville quantum gravity and multiplicative Chaos theory

10:15 – 10:40 Coffee break

10:40 – 11:55 Hugo Duminil-Copin (Universitè de Genève)
Geometric representations of low-dimensional lattice spin systems

11:55 – 12:05 Short Break

12:05 – 12:50 Contributed talk session:
Alexander Glazman (University of Geneva)
Discretization of the stress-energy tensor as a new observable for $O(n)$ model

Antal Jarai (University of Bath)
Avalanche size exponent for sandpiles on Galton-Watson trees

Márton Balázs (University of Bristol)
Electric network for non-reversible Markov chains

12:50 – 14:10 Lunch

14:10 – 15:00 Perla Sousi (University of Cambridge)
Uniformity of the late points of random walk on Z_n^d for $d \geq 3$

15:00 – 15:50 Ron Peled (Tel Aviv University)
Delocalisation of two-dimensional random surfaces with hard-core constraints

15:50 – 16:10 Coffee Break

16:10 – 17:00 Kenneth Alexander (University of Southern California)
Polymer pinning with sparse disorder

Friday, 27th June 2014.

9:00 – 10:15 Christophe Garban (ENS Lyon)
Lectures around Liouville quantum gravity and multiplicative Chaos theory

10:15 – 10:40 Coffee break

10:40 – 11:55 Hugo Duminil-Copin (Universitè de Genève)
Geometric representations of low-dimensional lattice spin systems

5 List of participants and speakers*

1. Daniel Ahlberg (IMPA) *
2. Roberta Albuquerque (Warwick University)

3. Kenneth Alexander (University of Southern California) *
4. Marton Balazs (University of Bristol) *
5. Deepan Basu (Max Planck Institute for Mathematics in Natural Sciences)
6. Nathanael Berestycki (University of Cambridge) *
7. Michiel van den Berg (University of Bristol)
8. Stein Andreas Bethuelsen (Leiden University)
9. Elisabetta Candellero (University of Warwick)
10. Alessandra Cipriani (Weierstrass Institut) *
11. Edward Crane (University of Bristol)
12. Tom Crawley (University of Bath)
13. Alexander Dalinger (Technische Universitt Darmstadt)
14. Angus Davidson (University of Bristol)
15. Sander Dommers (Universit di Bologna) *
16. Hugo Duminil-Copin (Universit de Genve) *
17. Maren Eckhoff (University of Bath)
18. Nic Freeman (Bristol University)
19. Sam Gamlin (University of Bath)
20. Ayalvadi Ganesh (University of Bristol)
21. Christophe Garban (ENS Lyon) *
22. Agelos Georgakopoulos (Warwick)
23. Alexander Glazman (University of Geneva) *
24. Nadine Guillotin-Plantard (Universit Lyon 1) *
25. Karen Habermann (University of Cambridge)
26. Jack Hanson (Indiana University)
27. Marion Hesse (Weierstrass Institute Berlin)
28. Frank den Hollander (Universiteit Leiden) *
29. Emma Horton (University of Bath)
30. Ostap Hryniv (Durham University)
31. Yichao Huang (ENS Paris)
32. Henry Jackson (University of Cambridge)
33. Emmanuel Jacob (UMPA)
34. Antal Jarai (University of Bath) *
35. Mathew Joseph (University of Sheffield)
36. Demeter Kiss (University of Cambridge and AIMR, Tohoku University)
37. Richard Kraaij (TU Delft)
38. Andreas Kyprianou (University of Bath)

39. Daniel Lanoue (U.C. Berkeley) *
40. Xinyi Li (ETH Zurich) *
41. Zhongyang Li (University of Cambridge)
42. Titus Lupu (Universit Paris Sud) *
43. Ccile Mailler (University of Bath)
44. Ioan Manolescu (University of Geneva) *
45. James Martin (University of Oxford)
46. Piotr Milos (University of Warsaw)
47. Peter Morters (University of Bath)
48. Edward Mottram (University of Cambridge)
49. Ioanna Nteka (University of Warwick)
50. Neil O'Connell (University of Warwick/Trinity College Dublin) *
51. Mehmet z (Koc University, Istanbul)
52. Steven Pagett (University of Bath)
53. Yuchen Pei (University of Warwick)
54. Ron Peled (Tel Aviv University) *
55. Mathew Penrose (University of Bath)
56. Richard Pymar (University College London)
57. Thomas Rafferty (University of Warwick)
58. Alejandro Ramirez (Pontificia Universidad Catlica de Chile) *
59. Istvan Redl (University of Bath)
60. Matt Roberts (University of Bath)
61. Pierre-Franois Rodriguez (Eidgenoessische Technische Hochschule) *
62. Bati Sengul (University of Cambridge)
63. Leonardo Avelio Seplveda Donoso (Universite Paris-Sud/Ecole Polytechnique)
64. Vladas Sidoravicius (IMPA)
65. Vittoria Silvestri (University of Cambridge)
66. Perla Sousi (University of Cambridge) *
67. Alexandre Stauffer (University of Bath)
68. Rongfeng Sun (National University of Singapore) *
69. Lorenzo Taggi (Max Planck Institute for Mathematics in the Sciences) *
70. Kevin Tanguy (Institut de Mathmatiques de Toulouse)
71. Pierre Tarres (University of Oxford) *
72. Augusto Teixeira (IMPA) *
73. Niccol Torri (University Lyon 1)
74. Yvan Velenik (Universit de Genve) *

75. Minmin Wang (LPMA, UPMC) *
76. Felizitas Weidner (Technical University of Munich)