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Decreto Rettore Università di Roma “La Sapienza” n. 2267/2021 del 09/08/2021

## VITTORIA SILVESTRI

### Curriculum Vitae

Ai fini della pubblicazione

Place: , Italy

Date: 29/9/2021

#### Part I – General Information

Full Name	Vittoria Silvestri
Date of Birth	
Place of Birth	
Citizenship	Italian
Permanent Address	
Mobile Phone Number	
E-mail	
Spoken Languages	Italian (mother tongue) English (fluent)

#### Part II – Education

Type	Year	Institution	University degree
University graduation	2010	Università di Roma La Sapienza	Laurea triennale in Matematica. Voto finale: 110/110 cum laude Advisor: Prof. Mauro Piccioni
	2012	Università di Roma La Sapienza	Laurea magistrale in Matematica. Voto finale: 110/110 cum laude Advisor: Prof.ssa Alessandra Faggionato
PhD	2016	University of Cambridge	PhD degree in Mathematics Advisor: Prof. James Norris

#### Part III – Appointments

##### IIIA – Academic Appointments

Start	End	Institution	Position
1/10/2016	30/9/2019	Jesus College, University of Cambridge	Research Fellow
1/9/2018	31/12/2018	New York University Shanghai	Visiting Assistant Professor of Mathematics
1/1/2019	30/9/2019	DPMMS, University of Cambridge	Temporary lecturer
2/10/2019	1/10/2022	Università di Roma La Sapienza	Ricercatore di tipo A

## Part IV – Teaching experience

Year	Institution	Lecture/Course
2013 2014 2017	University of Cambridge	Markov Chains (2nd year), Tutorials
2013 2014 2015	University of Cambridge	Advanced Probability (4th year), Tutorials
2015	IMéRA, Marseille	Hastings-Levitov growth and the GFF, Research course (3 lectures)
2016	University of Cambridge	Stochastic Calculus (4th year), Tutorials
2016	NYU Shanghai	Off-lattice models of planar aggregation, Research course (5 lectures)
2017	University of Cambridge	Stochastic Calculus (4th year), Lecture course (~35 students), final exam
2018	University of Cambridge	Probability (1st year), Tutorials
2018	NYU Shanghai	Probability and Statistics (2nd & 3rd year), Lecture course (~50 students), tutorials and final exam
2019	University of Cambridge	Probability (1st year), Lecture course (~240 students)
2019	Università di Roma La Sapienza	Istituzioni di Matematica II (2nd year) Lecture course and exams (~ 90 students)
2020	Università di Roma La Sapienza	Tempi di mixing e giochi di carte (2nd & 3rd year) Short lecture course for the excellence course (5 lectures, 17 students)
2020 2021	Università di Roma La Sapienza	Calcolo Stocastico e Applicazioni (5th year) Lecture course and exams (~15 students)
2021	Università di Roma La Sapienza	Probabilità I (1st year) Example classes, 12 hours (~60 students)
2021	Università di Roma La Sapienza	High Dimensional Probability PhD course, co-taught in English (3 lectures, ~20 participants)
2021	Università di Roma La Sapienza	Probability (2nd year, ACSAI) Lecture course (~60 students) Taught in English with Mauro Piccioni

## Part V - Awards and Honours

Year	Title
2010	BSc Excellence Course, University of Rome La Sapienza Reimbursement of one year of university fees
2011-12	Erasmus Scholarship, 9 months, University of Rome La Sapienza
2012	MSc Excellence Course, University of Rome La Sapienza Reimbursement of one year of university fees
2012-16	PhD scholarship, 4 years, funded by DPMMS and DAMTP, University of Cambridge
2013	Queens' College travel grant, University of Cambridge
2014	Smith-Knight / Raileigh-Knight prize, University of Cambridge
2015	Queens' College travel grant, University of Cambridge
2020	Visiting Professors' grant (5000€) University of Rome La Sapienza

## Part VI - Funding Information [grants as PI-principal investigator or I-investigator]

2020	Visiting Professors' grant (5000€) University of Rome La Sapienza
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## Part VII – Research Activities

Keywords	Brief Description
Random walks on periodic structures	In collaboration with Alessandra Faggionato (La Sapienza) I have studied the asymptotic properties of random walks on a class of periodic graphs called quasi one-dimensional lattices. In our joint works [1]-[2]-[4] we proved law of large numbers, central limit theorem and large deviation principle for such walks. Focusing on large deviations, we characterised the class of graphs for which a Gallavotti-Cohen type symmetry holds. Our work generalises several existing results in the biophysics literature.

Laplacian growth on the complex plane	The Hastings-Levitov (HL) models and Aggregate Loewner Evolution (ALE) describe the growth of a random compact set in the complex plane as the result of subsequent composition of random conformal maps. The striking feature of these models is that the maps correlation can be tuned to control the boundary growth, thus allowing to describe fundamental processes such as DLA and Eden growth. In [3] I have studied the fluctuations of HL(0), showing that these are given by a version of the celebrated Gaussian Free Field, a conformally invariant random field. In [8]-[9], in collaboration with James Norris (Cambridge) and Amanda Turner (Lancaster and Geneva), we generalised the analysis to the ALE models, describing scaling limit and fluctuations. Our work shows that these models, and hence the Hastings-Levitov models, undergo a phase transition, which settles a 20 years old conjecture.
	In a recent preprint [10] with Nathanael Berestycki (Vienna) I considered a variant of the HL model on the upper half-plane, where the growth is constrained to the aggregate. We show that in this setting the cluster grows explosively, in that it accumulates infinite diameter as soon as it reaches positive capacity.
Internal Diffusion Limited Aggregation	IDLA is a discrete model of random growth on infinite graphs, whose asymptotic properties are well understood. Rather than as a growth process, one could look at IDLA as a Markov chain on the infinite space of configurations, and ask about mixing behaviour and stationary measure. In a joint work [5] with Lionel Levine (Cornell) I addressed these questions, proving sharp estimates for stationary states and total variation mixing time. In a recent follow-up paper [7], I generalised these bounds to a large class of cylinder graphs $G \times \mathbb{Z}$ , relating the mixing of IDLA to the mixing of the base graph $G$ .
Linear response	Consider a Markov jump process whose jump rates are perturbed, the perturbation being small. How does the system respond to this perturbation? In an ongoing joint work [11] with Alessandra Faggionato (La Sapienza) we address this question for Markov jump processes and for the larger class of Piecewise Deterministic Markov processes, obtaining explicit formulas for the linear response of these systems with the aid of Stochastic Calculus techniques for discontinuous processes.

## Part VIII – Summary of Scientific Achievements

Product	No.	Title and authors	Year	Journal
Research paper	1	A. Faggionato, V. Silvestri Discrete kinetic models for molecular motors: asymptotic velocity and gaussian fluctuations	2014	Journal of Statistical Physics
Research paper	2	A. Faggionato, V. Silvestri Random walks on quasi one-dimensional lattices: large deviations and fluctuation theorems	2017	Annales de l'Institut Henri Poincaré, Probabilités et Statistiques
Research paper	3	V. Silvestri Fluctuation results for Hastings-Levitov planar growth	2017	Probability Theory and Related Fields

Research paper	4	A. Faggionato, V. Silvestri Fluctuation theorems for discrete kinetic models of molecular motors	2017	Journal of Statistical Mechanics: Theory and Experiments
Research paper	5	L. Levine, V. Silvestri How long does it take for Internal DLA to forget its initial profile?	2019	Probability Theory and Related Fields
Research paper	6	V. Silvestri Internal DLA on cylinder graphs: fluctuations and mixing	2020	Electronic Communications in Probability
Research paper	7	L. Levine, V. Silvestri How far do Activated Random Walkers spread from a single source?	2021	Journal of Statistical Physics (accepted for publication)

### Preprints and forthcoming works:

Research paper	8	J. Norris, V. Silvestri, A. Turner Scaling limits for planar aggregation with subcritical fluctuations.	2019	Arxiv preprint Submitted
Research paper	9	J. Norris, V. Silvestri, A. Turner Stability of regularised Hastings-Levitov aggregation in the subcritical regime	2021	Arxiv preprint Submitted
Research paper	10	N. Berestycki, V. Silvestri Explosive growth for a constrained Hastings-Levitov aggregation model	2021	Arxiv preprint
Research paper	11	A. Faggionato, V. Silvestri A martingale approach to time-dependent linear response in Markov jump processes and PDMP's	2021	Preprint

### Lecture notes:

Lecture notes for University of Cambridge	J. Miller, V. Silvestri Stochastic Calculus	2017, unpublished
Lecture notes for NYU Shanghai	V. Silvestri Probability and Statistics	2018, unpublished
Lecture notes for University of Cambridge	V. Silvestri Probability	2019, unpublished

### Bibliometric information:

Total number of research articles	Scopus: 6 Google Scholar: 10
Hirsch (H) index	Scopus: 3 Google Scholar: 4

Total number of Citations	Scopus: 16 Google Scholar: 47
Average number of Citations per Product	Scopus: 2.67 (calculated as 16/6) Google Scholar: 5.22 (calculated as 47/9)
Total Impact factor	11.166 (calculated as the sum of each published paper's impact factor)
Average impact factor	1.59 (calculated as 11.166/7)

### Part IX– Selected Publications

List of the publications selected for the evaluation. For each publication report title, authors, reference data, journal IF (if applicable), citations, press/media release (if any).

**1. A. Faggionato, V. Silvestri**

Discrete kinetic models for molecular motors: asymptotic velocity and gaussian fluctuations.

Journal of Statistical Physics 157.6 (2014): 1062-1096

Scopus citations: 3

Google scholar citations: 2

Journal impact factor: 1.202

**2. A. Faggionato, V. Silvestri**

Random walks on quasi one-dimensional lattices: large deviations and fluctuation theorems.

Annales de l'Institut Henri Poincaré, Probabilités et Statistiques (2017), Vol. 53, No. 1, 46-78

Scopus citations: 4

Google scholar citations: 3

Journal impact factor: 1.113

**3. V. Silvestri**

Fluctuation results for Hastings-Levitov planar growth.

Probability Theory and Related Fields 167.1-2 (2017): 417-460

Scopus citations: 6

Google scholar citations: 17

Journal impact factor: 1.992

**4. A. Faggionato, V. Silvestri**

Fluctuation theorems for discrete kinetic models of molecular motors.

Journal of Statistical Mechanics: Theory and Experiments (JSTAT), (2017): 043206

Scopus citations: 3

Google scholar citations: 4

Journal impact factor: 2.404

**5. L. Levine, V. Silvestri**

How long does it take for Internal DLA to forget its initial profile?

Probability Theory and Related Fields 174.3-4 (2019): 1219-1271

Scopus citations: 0

Google scholar citations: 7

Journal impact factor: 2.125

6. V. Silvestri

Internal DLA on cylinder graphs: fluctuations and mixing.

Electronic Communications in Probability 25 (2020): 1-14

Scopus citations: 0

Google Scholar citations: 3

Journal impact factor: 0.782

7. L. Levine, V. Silvestri

How far do Activated Random Walkers spread from a single source?

Journal of Statistical Physics, accepted (2021)

Scopus citations: n/a

Google Scholar citations: 1

Journal impact factor: 1.548 (Computed for 2020, as the IF for the year 2021 is not yet available)

8. J. Norris, V. Silvestri, A. Turner

Scaling limits for planar aggregation with subcritical fluctuations.

Arxiv preprint. Submitted.

Google Scholar citations: 9

9. J. Norris, V. Silvestri, A. Turner

Stability of regularised Hastings-Levitov aggregation in the subcritical regime.

Arxiv preprint. Submitted.

Google Scholar citations: 1

10. N. Berestycki, V. Silvestri

Explosive growth for a constrained Hastings-Levitov aggregation model.

Arxiv preprint.

## **Part X - Research visits, seminars and conferences**

### **Research visits:**

- 2015 (2 weeks) Cornell University, Ithaca (NY). Host: Prof. Lionel Levine.
- 2015 (10 days) MIT, Cambridge (MA). Host: Prof. Scott Sheffield.
- 2013 (1 month) University of Rome La Sapienza, Italy. Host: Prof. Alessandra Faggionato.
- 2016 (5 weeks) NYU Shanghai, China. Host: Prof. Vladas Sidoravicius.
- 2017 (1 week) Microsoft Research Seattle, (WA). Host: Prof. Yuval Peres.
- 2017 (1 week) Cornell University, Ithaca (NY). Host: Prof. Lionel Levine.
- 2019 (1 month) IAS, Princeton (NJ). Host: Prof. Lionel Levine.

### **Invited seminars:**

2013:

- C.A.K.E. seminar, University of Cambridge, UK.

2014:

- CCA-MASDOC conference, University of Cambridge, UK.

2015:

- CCA-MASDOC conference, University of Warwick, UK.
- Probability seminar, University of Cambridge, UK.
- Probability seminar, University of Rome La Sapienza, Italy.
- Probability seminar, Cornell University, NY.
- Mini-course (3 lectures), Probability workshop at IMÉRA, Marseille, France.
- JFR in Probability, Berlin, Germany (contributed talk).
- Probability seminar, University of Bath, UK.
- Probability seminar, University of Oxford, UK.

2016:

- Probability seminar, Université Toulouse III - Paul Sabatier, France.
- Student seminar, Université Toulouse III - Paul Sabatier, France.
- C.A.K.E. seminar, University of Cambridge, UK.
- UK Easter Probability Meeting 2016, Lancaster University, UK (student talk).
- Probability seminar, Graz University of Technology, Austria.
- Workshop on Random Processes in Discrete Structures, Warwick, UK (invited talk).
- Probability seminar, Stockholm University, Sweden.

2017:

- Lancaster Probability Days 2017, Lancaster University, UK (invited talk).
- Postgraduate forum talk, Lancaster University, UK.
- Stochastic Analysis seminar, University of Oxford, UK.
- Random Geometry in Cambridge, Isaac Newton Institute, UK (invited talk).
- Probability seminar, University of Rome La Sapienza, Italy.
- Probability seminar, Cornell University, NY.

2018:

- Probability seminar, University of Bristol, UK.
- Probability seminar, Princeton University, NJ.
- Probability in the North-East meeting, University of Sheffield, UK (invited talk).
- Universality in Probability Theory and Statistical Mechanics, Ischia, Italy (invited contributed talk).
- NYU Shanghai - Kyoto University Young Probabilists' Meeting, China (invited talk).
- Young Probabilists Workshop, Chern Institute of Mathematics, China (invited talk).
- Probability seminar, NYU Shanghai, China.

2019:

- Probability seminar, University of Bonn, Germany.
- Department seminar, University of Rome La Sapienza, Italy.
- Large Scale Random Structures, University of Milano-Bicocca, Italy.
- Mathematical Physics seminar, University of Geneva, Switzerland.

2020

- Discrete Probability in Spetzes, Greece. [Cancelled]
- Recent progress on random walks, CIRM, France. [Postponed]
- Workshop women in Probability, Munich, Germany. [Online talk]
- Markov chains with kinetic constraints and applications, Banff, Canada. [Cancelled]
- Scaling limits: from statistical mechanics to manifolds, Cambridge, UK. [Postponed]
- Guest lecture for the graduate course MATH 7710 on Abelian models, Cornell, NY. [Online talk]
- Probability seminar, University of Cambridge, UK. [Online talk]
- Ypatia 2020, Rome, Italy. [Cancelled]

2021

- Probability seminar, Ecole Polytechnique, Paris, France. [Online talk]
- Probability seminar, Université de Lyon, France. [Online talk]



- Joint probability seminar, Warwick-Bristol-Queen Mary, UK. [Online talk]
- Recent progress on random walk, CIRM, France. [Online talk]
- Probability seminar, University of Vienna and IST, Austria.
- Joint Israeli Probability Seminar (JIPS), Israel. [Online talk]

### **Conferences and schools:**

2013:

- UK Easter Probability Meeting, University of Cambridge, UK.
- Beg Rohu summer school on disordered systems, Saint Pierre Quiberon, France.

2014:

- School and Workshop on Random Interacting Systems, University of Bath, UK.

2015:

- Random Geometry semester, Isaac Newton Institute, Cambridge UK.
- LMS-CMI Research School, Oxford, UK.
- 38th Conference on Stochastic Processes and their Applications, Oxford, UK.
- Workshop on Random Walks on Random Graphs, DLA and Related Topics, Marseille, France.
- JFR in Probability 2015, Berlin, Germany.

2016:

- UK Easter Probability Meeting, Lancaster University, UK.
- School and Workshop on Random Interacting Systems, University of Bath, UK.
- EMS-IAMP Summer School in Mathematical Physics, Rome, Italy.
- Workshop on Random Processes in Discrete Structures, Warwick, UK.

2017:

- Lancaster Probability Days, Lancaster, UK.
- Random walks with memory, CIRM, France.
- Random Geometry in Cambridge, University of Cambridge, UK.

2018:

- Strongly Correlated Random Interacting Processes, Oberwolfach, Germany.
- Universality in Probability Theory and Statistical Mechanics, Ischia, Italy
- Random Geometry follow-up, Isaac Newton Institute, Cambridge, UK.
- NYU Shanghai - Kyoto University Young Probabilists' Meeting, Shanghai, China.
- Young Probabilists Workshop, Chern Institute of Mathematics, China.

2019:

- Large Scale Random Structures, University of Milano-Bicocca, Italy.

2020:

- Discrete Probability in Spetzes, Greece. [Cancelled]
- Recent Progress on Random Walks, CIRM, Marseille, France. [Postponed]
- Workshop women in probability, Munich, Germany. [Online]
- Markov Chains with Kinetic Constraints and Applications, BIRS, Banff, Canada. [Cancelled]
- Scaling limits: from statistical mechanics to manifolds, Cambridge, UK. [Postponed]

2021:

- Linear Response: Rigorous Results and Applications, Lausanne, Switzerland. [Online]
- Recent progress on random walk, CIRM, France. [Online]

### **Part XI - Academic service**

- Organizer of C.A.K.E. (Cambridge Analysts Knowledge Exchange) seminars, University of Cambridge. (2014)
- Co-organizer of a reading group on Internal DLA together with Perla Sousi, University of Cambridge. (2016)

- Interviewer for the admission of undergraduate students at Jesus College (23 interviews), University of Cambridge. (2017)
- Supervision of Part III (4th year) students for their Master's essays (3 students), University of Cambridge. (2018)
- Member of the PhD admissions committee (substitute member), University of Rome La Sapienza. (2020)
- Member of the Excellence course committee, University of Rome La Sapienza. (2020-21)
- Member of the committee for the selection of Tutors, University of Rome La Sapienza. (2021)
- Co-organizer of the PhD course "High Dimensional Probability" with Alessandra Faggionato and Lorenzo Taggi. (2021)
- Supervision of \_\_\_\_\_ for undergraduate thesis (110/110 cum laude). (2021)
- Supervision of \_\_\_\_\_ for Master thesis (110/110). (2021)
- Organizer of the PhD course "Introduction to the GFF, Gaussian Multiplicative Chaos and Liouville Quantum Gravity", held by N. Berestycki at the University of Rome La Sapienza. (2021)
- Referee for: Communications in Mathematical Physics, Annals of Applied Probability, Annales de l'Institut Henri Poincaré Probabilités et Statistiques, Electronic Journal of Probability, Electronic Communications in Probability, Journal of Theoretical Probability, Markov Processes and Related Fields.

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Note: journal impact factors calculated on InCites Journal Citations Report according to the year of publication.

**Tutte le informazioni contenute in questo documento corrispondono a verità, ai sensi degli articoli 46 e 47 del D.P.R. 445 del 2000.**

., 29/9/2021