Curriculum Vitae

PERSONAL DATA

Family Name, First Name : RHODES, Rémi
Date/place of birth : 30/01/1979, Marseille (France), French citizen.
Webpage : https://www.i2m.univ-amu.fr/perso/remi.rhodes/english.html
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EDUCATION

2012 Habilitation thesis, Université Paris-Dauphine, Paris (France), *Chaos multiplicatif and applications.*

2003-2006 PhD thesis in Université de Provence, Marseille (France), supervised by Etienne Pardoux : *Homogenization in random media.*

2001-2003 Student of Ecole Normale Supérieure de Cachan (France).

CURRENT POSITION

2018-2024 Full professor (PR1) at Aix-Marseille Université (France).

PREVIOUS POSITIONS

2014-2018 Full professor at Université Paris-Est Marne la Vallée (France).

2007-2014 Maître de conférence at University Paris-Dauphine (France).

FELLOWSHIP AND AWARDS

2022 George Polya prize in mathematics
> *Prize description :* The George Pólya Prize in Mathematics is awarded every four years for a significant contribution, as evidenced by a refereed publication, in an area of mathematics of interest to George Pólya.
> *Previous recipients :* E. Candès, T. Tao, G. Lawler, O. Schramm, W. Werner, C. Tracy, H. Widom, P. Deift, P. Sarnak, H. Kesten, ...

2019 Marc Yor prize of the French Academy of Sciences
> *Prize description :* Ce prix vise à récompenser chaque année une jeune mathématicienne ou un jeune mathématicien spécialiste des probabilités exerçant en France ; il est destiné à promouvoir les probabilités et leurs applications.
> *Other recipients :* C. Bordenave, C. Garban, K. Raschel, C. Toninelli, N. Curien, JC. Mourrat.

2019-2024 Junior member of Institut Universitaire de France (French Academy of Sciences).

2018 Editors' pick from the Annals of Probability 2014/2018 in 2018 IMS Annual Meeting.

2016 Bernoulli prize of the Bernoulli Society
> *Prize description :* The Bernoulli Prize for an Outstanding Survey Article is to recognize authors of an influential survey publication in the areas of probability and statistics, respectively. The paper should be timely in addressing areas of active or emerging importance, but have been in circulation long enough for there to be evidence of its impact.
> *Other recipients :* N. Berestycki, V. Vargas, A. Borodin, L. Petrov, U. Von Luxburg, C. Ley, G. Reinert.

GRANTS

2022-2026 PI of the french ANR Grant ANR-21-CE40-0003 (260k€, 2022-2026).

2020-2021 PI of the European Grant Marie Curie QUANTGMC (130k€, 2020-2021).

2011-2019 Member of 2 French ANR grants : ANR-11-JS01-0005, ANR-15-CE40-0013.

2014-2023 Member of 2 french GDR (GDR Analyse multifractale, GDR TRAG).

PAST SUPERVISIONS OF GRADUATE STUDENTS AND MASTER STAGES

2010-2012 PhD advisor of Romain Allez. Now works in Capital Fund Management (France).

2014-2017 PhD advisor of Yichao Huang. Now fellow researcher at Beijing Institute of Technology, China.

2015-2018 PhD advisor of Guillaume Rémy. Now CNRS CR at university Paris-Dauphine.

2020-2023 PhD advisor of Baojun Wu, now postdoc at Peking University.

2022-2025 PhD advisor of Nathan Huguenin, ongoing.

2007-2022 Supervisions of more than 30 master stages.

ONGOING SUPERVISION OF GRADUATE STUDENTS

2022-2025 PhD advisor of Nathan Huguenin, ongoing.

ORGANIZATION OF RECENT SCIENTIFIC MEETINGS

2025 summer Organizer of a trimester *Probability in Quantum Field Theory* (with R. Bauerschmidt, E. Peltola, E. Powell, E. Saksman) at Hausdorff Institute in Bonn (Germany)

2024 nov. co-organizer with D. Bernard, M. Gubinelli, A. Kupiainen, N. Nekrasov of a thematic month *Constructing QFT using probabilistic, combinatorial and other methods* at Stony Brooke (USA), Simons center for Geometry and Physics.

2024 sept. Organizer of the Conference *Path integrals and friends* (with E. Peltola, E. Järvenpää, K. Kytölä, P. Laarne, P. Muratore-Ginanneschi, J. Oikarinen, J. Turunen, C. Webb) in Helsinki (Finland)

2024 april co-organiser with J. Aru, C. Guillarmou of the workshop *Probability in Conformal Field Theory*, at Bernoulli Center, Lausanne

2022-2024 Organizer (with C. Garban, A. Kupiainen, F. Viklund) of a series of workshops at Mittag-Leffler Institute (Stockholm, Sweden) entitled *Probability and Quantum Fields*.

2022 sept. Organizer of the workshop *Recent advances in Conformal Field Theories*, Agay (France).

2022 june Organizer of the mini-workshop *Probability and CFT* at Porquerolle

2022 jan. Organizer of the Conference *Random geometry*, at the CIRM (Marseille).

2021 oct. Organizer of the workshop *Integrability in conformal probability*, online.

2019 june Organizer of the conference *Probability and quantum field theory : discrete models, CFT, SLE and constructive aspects*, Porquerolle (France).

2016 sept. Director of the summer school *Quantum integrable systems, conformal field theories and stochastic processes*, Cargese.

2019-2024 Organizer of the biannual seminar *Hypatie*, Institute of Mathematics (Marseille).

TEACHING ACTIVITIES

2019-2024 64h/year undergraduate teaching at Aix-Marseille Université, Marseille (France).

2018-2019 192h/year undergraduate teaching at Aix-Marseille Université, Marseille (France).

2014-2018 192h/year undergraduate teaching at Université Paris-Est Marne La Vallée and Ecole Nationale des Ponts et Chaussée (France).

2007-2014 192h/year undergraduate teaching at Université Paris-Dauphine (France).

2013 Master 2 courses : Lévy processes, Brownian motion and Itô calculus, Gaussian Multiplicative chaos, Stochastic homogenization.

INSTITUTIONAL RESPONSABILITIES

2024– Co-director of the Institut de Mathématiques de Marseille (I2M) at Aix-Marseille University (about 250 research members).

2020/2024 Head of the team ALEA at Aix-Marseille University (about 100 research members).

2020– Member of the Executive committee of the Institute of Mathematics (Marseille).

2020/2023 Member of CNU section 26 (National Council of Universities)

2019– Member of the Department Council of the Institute of Mathematics (Marseille).

2019– President and member of the Commission Prospective of the Institute of Mathematics (Marseille).

2015/2018 Member of the Department Council of LAMA (University Paris-Est).

2015/2018 Member of the Scientific Council of University Paris-Est.

2015/2018 Member of the Research Council of University Paris-Est.

2015/2018 Head of the team Probability and Statistics at University Paris-Est.

2012/2017 Member of the jury of French Agregation in Maths.

2009– Member of various recruitment committees.

REVIEWING ACTIVITIES

2024– Associate editor, *Journal de l'Ecole Polytechnique.*

2024– Associate editor, *Mathematical Physics, Analysis and Geometry.*

2021– Associate editor, *Annales de l'Institut Henri Poincaré, Probabilités and Statistiques.*

2021– Associate editor, *Astérisque SMF*

2010-2023 Austrain Science Fund, Scientific evaluation for the NSF (USA), ERC, Royal Swedish Academy of Sciences, National Science Center (Poland), ANR (France), US-Israel Binational Science Foundation, referee for many journals (Acta Mathematica, Inventiones Math., Duke Math. Journal, Journal of European Mathematical Society, Annals of Probability, Probability and Related Fields, Communications in Mathematical Physics, Probability and Mathematical Physics, Journal of Functional Analysis,...).

2010– referee for PhD dissertation : Yaya Sagna (advisor A.B. Sow, university of Saint-Louis Senegal), Mikka Nikula (advisor E.Saksman, university of Helsinki, Finland), Christian Webb (advisor A.Kupiainen, university of Helsinki, Finland), Charles Manson (advisor M.Hairer, University of Warwick, UK), Guillaume Baverez (advisor J. Miller, university of Cambridge, UK).

2018– referee for Habilitation dissertations : Raphael Chetrite (university of Nice), Titus Lupu (Paris-Sorbonne university).

MAJOR COLLABORATIONS

Colin Guillarmou, *Geometry and scattering theory*, university Paris-Saclay (France)

Antti Kupiainen, *Mathematical Physics*, university of Helsinki, (Finland).

Bertrand Duplantier *Physics*, IPhT CEA-Saclay (France)

Hubert Lacoin, *Probability Theory*, IMPA (Brasil).

Scott Sheffield *Probability Theory*, MIT Boston (USA)

Vincent Vargas, *Probability Theory*, Univ. of Geneva (Switzerland).

PUBLICATIONS

54 manuscripts, most of them peer reviewed and published in maths journals (including Acta Math., Ann. Math, Duke, Public. scient. IHES, Ann. of Probab., PTRF, Comm. in Math.Phys., etc...) Full list at `https://www.i2m.univ-amu.fr/perso/remi.rhodes/english.html`

RECENT REPRESENTATIVE PUBLICATIONS

Rémi Rhodes has in total 34 peer reviewed published papers during the last ten years. He pioneered the renewal of GMC theory with V. Vargas and the study of its critical phase in

Duplantier B., Rhodes R., Sheffield S., Vargas V., *Critical Gaussian multiplicative chaos : convergence of the derivative martingale,* **Annals of Probability** 42 no. 5, 1769-1808 (2014).

Then, using GMC theory, he constructed the path integral of Liouville Conformal Field Theory (CFT), which was unexpected even in physics, in the seminal work (for which the Marc Yor prize was awarded) :

David F., Kupiainen A., Rhodes R., Vargas V., *Liouville Quantum Gravity on the Riemann sphere,* **Communications in Mathematical Physics**, 342 (3) (2016), 869-907.

This construction was then extended to arbitrary Riemann surfaces and served to prove the convergence of non-critical string theory :

Guillarmou C., Rhodes R., Vargas V., *Polyakov's formulation of 2d bosonic string theory,* **Publications mathé-matiques de l'IHES**, 130 (2019), 11-185.

In parallel, he introduced a new topical object, the Liouville Brownian motion, as a prototype of diffusion in multifractal environment and related this object to fundamental questions such that the structure of its heat kernel or its relation to the metric in Liouville quantum gravity :

Garban C., Rhodes R., Vargas V., *Liouville Brownian motion,* **Annals of Probability** 44 no. 4, 3076-3110 (2016).

This paper was selected as being part of the best 3 papers of the journal for the period 2014-2018 by the editorial board and the conjectures/questions formulated in this paper are still worked on. Then he solved the Liouville CFT in the following series of papers, published in the best math journals :

Kupiainen A., Rhodes R., Vargas V., *Integrability of Liouville theory : proof of the DOZZ Formula,* **Annals of Mathematics**, 191 (1) (2020), 81-166.

Guillarmou C., Kupiainen A., Rhodes R., Vargas V., *Conformal bootstrap in Liouville theory,* **Acta Mathematica**, to appear 2022.

These works were awarded the George Polya Prize 2022 and were selected by Quanta Magazine among the 3 works for "2021's biggest breakthrough in maths and computer sciences". Also they restored the importance of the path integral in the approach of QFTs. This effort was then pursued to construct the path integral and initiate the study for several other CFTs/QFTs in :

Lacoin H., Rhodes R., Vargas V., *Path integral for quantum Mabuchi K-energy,* **Duke Math journal**, 171 (3) (2022), 483-545.

Cerclé B., Rhodes R., Vargas V., *Probabilistic construction of Toda Conformal Field Theories,* **Annales Henri Lebesgue**, to appear 2022.

Lacoin H., Rhodes R., Vargas V., *A probabilistic approach of ultraviolet renormalisation in the boundary Sine-Gordon model,* **Probability Theory and Related Field** vol 185, 1-40, (2023).

Another important path integral construction is the Compactified Imaginary Liouville Theory which conjecturally arises in the scaling limit of loop models. Interestingly, it is also the first mathematical instance of Logarithmic CFT, and as such constitutes a promising case of study

Guillarmou C., Kupiainen A., Rhodes R., *Compactified Imaginary Liouville Theory,* arXiv preprint.

RECENT INVITED CONFERENCES

Rémi Rhodes has received more than 40 invitations to speak at international conferences and advanced schools in the last three years and this number goes increasingly along years. This includes invitations to birthday conferences of the most prominent mathematicians/physicists

2024 Conference "Path integrals and frielnds" in honor of Antti Kupiainen's birthday, Helsinki

2023 "Statistical Mechanics Conference" in honor of Antti Kupiainen's birthday, Rutgers.

2022 Global Harmonic Analysis : a conference in honor of Steve Zelditch.

2021 Conference Denis Bernard's 60th birthday, Paris.

or major probabilistic events

2024 Conference "Conformal field theory 3 ways : integrable, probabilistic, and supersymmetric", Les Diablerets (Switzerland)

2024 Conference "Probability and Quantum Fields II, Stockholm (Sweden)

2024 International Congress of Mathematical Physics (ICMP), Strasbourg (France)

2024 Conference "CFTs of minimal models ", Lausanne (Switzerland)

2024 Conference "Statistical Physics and Random Surfaces", Oberwolfach (Germany),

2023 Conference "Conference on Probability and Stochastic Analysis", Beijing (China).

2023 Conference "Random Conformal Geometry and Related Fields", Jeju (Korea).

2023 Conference "Random Geometry in Math & Physics", Nimegue (Netherlands)

2022 Conference Coulomb gases and universality, Paris.

2022 Conference Probability and Mathematical Physics, Helsinki (Finland).

2022 Conference The Analysis and Geometry of Random Spaces, San Francisco (USA).

The impact of his work can also be measured through invitations received from various communities (physics, geometry, fractal analysis,etc...) or conferences with large audience

2024 Workshop "Recent Developments in Dirichlet Form Theory and Related Fields", Oberwolfach (Germany)

2023 Conference "3 facets of gravity", Berlin.

2023 Conference Landau Week, Erevan.

2022 Workshop on PDE and Conformal Geometry, San Jose.

2022 Global Harmonic Analysis : a conference in honor of Steve Zelditch.

2021 Journées MAS 2021, online.