

Elia BISI, PhD

ASSISTANT PROFESSOR, UNIVERSITY OF FLORENCE

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[Last update: 22nd September 2026]

WORK EXPERIENCE

SEP 2024–PRESENT	Assistant Professor ('Ricercatore Tenure Track'), University of Florence , Department of Mathematics and Computer Science <i>Research group:</i> Probability and Mathematical Statistics
SEP 2020–AUG 2024	Postdoc University Assistant ('Universitätsassistent'), TU Wien , Institute of Statistics and Mathematical Methods in Economics <i>Research unit:</i> Probability <i>Head of the research unit:</i> Fabio TONINELLI
JUL 2018–AUG 2020	Research Scientist, University College Dublin , School of Mathematics and Statistics <i>Funding:</i> ERC grant "Integrable random structures" <i>Supervisor:</i> Neil O'CONNELL
MAR 2014–SEP 2014	Research intern, STMicroelectronics , Agrate Brianza, Italy Advanced System Technology, Security Lab, Cryptography group

HIGHER EDUCATION

OCT 2014–JUL 2018	Ph.D. in STATISTICS, University of Warwick <i>Thesis:</i> "Random polymers via orthogonal Whittaker and symplectic Schur functions" (http://wrap.warwick.ac.uk/121448/) <i>Award date:</i> 18 December 2018 <i>Supervisor:</i> Prof. Nikos ZYGOURAS
OCT 2011–Nov 2013	MSc. in MATHEMATICS, Università di Milano-Bicocca <i>Erasmus exchange year, Universidad Autónoma de Madrid, 2012-2013</i> <i>Thesis:</i> "Large deviations" <i>Supervisor:</i> Prof. Francesco CARAVENNA <i>Final mark:</i> 110/110 <i>cum laude</i>
OCT 2008–Nov 2011	BSc. in MATHEMATICS, Università di Milano-Bicocca <i>Thesis:</i> "Algebre di composizione" <i>Supervisor:</i> Prof. Lino DI MARTINO <i>Final mark:</i> 110/110 <i>cum laude</i>

GRANTS

- 2026 | Research Grant “Emergent dynamics of interacting particle systems on random graphs”, co-investigator
€2k, awarded by the INdAM (Italian National Mathematics Institute) – GNAMPA (National Group of Mathematical Analysis, Probability and Applications)
Principal investigator: Simone BALDASSARRI
Other co-investigators: Luca AVENA, Dimitrios TSAGKAROGIANNIS
- 2025 | Grant for organising the workshop “Probability Models in Mathematical Physics – Integrability, asymptotics, and universality”, to be held in **Rome**, 15-19 June 2026
€15k, awarded by the INdAM (Italian National Mathematics Institute)
Other grantees: Fabio D. CUNDEN, Giovanni GRAMEGNA, Marilena LIGABÒ
- 2023 | Focused Research Grant “A graph-theoretic approach to the Jacobian conjecture: Part II”, co-investigator
£5k, awarded by the Heilbronn Institute for Mathematical Research
Principal investigator: Samuel G. G. JOHNSTON
Other co-investigators: Piotr DYSZEWSKI, Nina GANTERT, Joscha PROCHNO, Dominik SCHMID
- 2022 | Focused Research Grant “A graph-theoretic approach to the Jacobian conjecture”, co-investigator
£5k, awarded by the Heilbronn Institute for Mathematical Research
Principal investigator: Samuel G. G. JOHNSTON
Other co-investigators: Piotr DYSZEWSKI, Nina GANTERT, Joscha PROCHNO, Dominik SCHMID

SCHOLARSHIPS

- OCT 2014–MAR 2018 | EPSRC scholarship, **University of Warwick**
Covering PhD fees, awarded by the Engineering and Physical Sciences Research Council (EPSRC)
- OCT 2014–MAR 2018 | PhD maintenance bursary, **University of Warwick**
~£50k, awarded by the Department of Statistics at Warwick

AWARDS

- 2024 | *Best Paper Award 2023*, Faculty of Mathematics and Geoinformation, **TU Wien**
Prize: €1,000 for academic purposes
Paper awarded: **Matrix Whittaker processes** (Probab. Theory Relat. Fields, 2023)
- 2017 | *Prize Giving to Warwick*, **University of Warwick**
Awarded for an “outstanding contribution by PhD students to the Statistics Department’s teaching programme”.

HABILITATION

2025 | Italian National Scientific Habilitation as Associate Professor
Scientific field: MATH-03/B – Probability and Mathematical Statistics
Validity period: 28/02/2025 – 28/02/2037

PUBLICATIONS AND PREPRINTS

- [1] L. AVENA, E. BISI, and E. BORDIGA. **Semicircle laws with combined variance for non-uniform Erdős-Rényi hypergraphs** (2026). arXiv: [2604.01877](https://arxiv.org/abs/2604.01877).
- [2] E. BISI, P. DYSZEWSKI, N. GANTERT, S. G. G. JOHNSTON, J. PROCHNO, and D. SCHMID. **Random planar trees and the Jacobian conjecture**. *Journal of the London Mathematical Society* 113.1 (2026), e70416. DOI: <https://doi.org/10.1112/jlms.70416>.
- [3] E. BISI and F. D. CUNDEN. **λ -shaped random matrices, λ -plane trees, and λ -Dyck paths**. *Electronic Journal of Probability* 30 (2025), #24. DOI: [10.1214/25-EJP1268](https://doi.org/10.1214/25-EJP1268).
- [4] J. ARISTA, E. BISI, and N. O'CONNELL. **Matsumoto-Yor and Dufresne type theorems for a random walk on positive definite matrices**. *Ann. Inst. H. Poincaré (B) Probab. Statist.* 60.2 (2024). DOI: [10.1214/22-AIHP1338](https://doi.org/10.1214/22-AIHP1338).
- [5] J. ARISTA, E. BISI, and N. O'CONNELL. **Matrix Whittaker processes**. *Probability Theory and Related Fields* 187 (2023), pp. 203–257. DOI: [10.1007/s00440-023-01210-y](https://doi.org/10.1007/s00440-023-01210-y).
- [6] E. BISI, Y. LIAO, A. SAENZ, and N. ZYGOURAS. **Non-intersecting path constructions for TASEP with inhomogeneous rates and the KPZ fixed point**. *Communications in Mathematical Physics* 402 (2023), pp. 285–333. DOI: [10.1007/s00220-023-04723-8](https://doi.org/10.1007/s00220-023-04723-8).
- [7] E. BISI and N. ZYGOURAS. **Transition between characters of classical groups, decomposition of Gelfand-Tsetlin patterns and last passage percolation**. *Advances in Mathematics* 404.B (2022), p. 108453. DOI: [10.1016/j.aim.2022.108453](https://doi.org/10.1016/j.aim.2022.108453).
- [8] E. BISI, F. D. CUNDEN, S. GIBBONS, and D. ROMIK. **The oriented swap process and last passage percolation**. *Random Structures and Algorithms* 60.4 (2022), pp. 690–715. DOI: [10.1002/rsa.21055](https://doi.org/10.1002/rsa.21055).
- [9] E. BISI, N. O'CONNELL, and N. ZYGOURAS. **The geometric Burge correspondence and the partition function of polymer replicas**. *Selecta Mathematica New Series* 27 (2021), #100. DOI: [10.1007/s00029-021-00712-8](https://doi.org/10.1007/s00029-021-00712-8).
- [10] E. BISI, F. D. CUNDEN, S. GIBBONS, and D. ROMIK. **Sorting networks, staircase Young tableaux and last passage percolation**. *Séminaire Lotharingien de Combinatoire* 84B (2020), *Proceedings of the 32nd Conference on Formal Power Series and Algebraic Combinatorics*. 2020, #3. URL: <https://www.mat.univie.ac.at/~slc/wpapers/FPSAC2020/3.html>.
- [11] E. BISI and N. ZYGOURAS. **GOE and $\text{Airy}_{2 \rightarrow 1}$ marginal distribution via symplectic Schur functions**. *Probability and Analysis in Interacting Physical Systems: In Honor of S.R.S. Varadhan*. Ed. by P. FRIZ, W. KÖNIG, C. MUKHERJEE, and S. OLLA. Berlin: Springer, 2019. DOI: [10.1007/978-3-030-15338-0_7](https://doi.org/10.1007/978-3-030-15338-0_7).

- [12] E. BISI and N. ZYGOURAS. **Point-to-line polymers and orthogonal Whittaker functions**. *Transactions of the American Mathematical Society* 371.12 (2019), pp. 8339–8379. DOI: [10.1090/tran/7423](https://doi.org/10.1090/tran/7423).
- [13] E. BISI, F. MELZANI, and V. ZACCARIA. **Symbolic analysis of higher-order side channel countermeasures**. *IEEE Transactions on Computers* 66.6 (2017), pp. 1099–1105. DOI: [10.1109/TC.2016.2635650](https://doi.org/10.1109/TC.2016.2635650).

TEACHING

2025–PRESENT	Lecturer, University of Florence <i>Processi Stocastici</i> , MSc in Mathematics (2024-25, 2025-26, 2026-27) <i>Calcolo Probabilità e Statistica</i> , BSc in Mechanical Engineering (2025-26, 2026-27) <i>Probabilità</i> , MSc in Mathematics (2024-25)
2020–2024	Lecturer, TU Wien <i>Theory of Stochastic Processes</i> , MSc in Statistics and Mathematics in Economics (2023-24, 2022-23) <i>Mathematical Statistics</i> , MSc in Statistics and Mathematics in Economics (2023-24) <i>Seminar in Probability Theory</i> on: longest increasing subsequences in random permutations, MSc in Technical Mathematics (2020-21)
2020–2024	Instructor of problem classes, TU Wien <i>Theory of Stochastic Processes</i> , MSc in Statistics and Mathematics in Economics (2023-24, 2022-23, 2021-22, 2020-21) <i>Mathematical Statistics</i> , MSc in Statistics and Mathematics in Economics (2023-24, 2022-23, 2021-22) <i>Measure and Probability Theory 2</i> , various Mathematics and Statistics BSc programmes (2022-23)
2019	Substitute lecturer, University College Dublin <i>Probability Theory</i> , various BSc programmes (2019-20)
2015–2018	Teaching assistant, University of Warwick <i>Probability Theory</i> , BSc module (2017-18, 2016-17) <i>Mathematical Methods</i> , BSc module (2017-18) <i>Mathematics of Random Events</i> , BSc module (2016-17) <i>Stochastic Processes</i> , BSc module (2015-16) <i>Mathematical Techniques</i> , BSc module (2015-16) <i>Probability A & B</i> , BSc module (2014-15)

SUPERVISION

2026-27	MSc thesis supervisor, University of Florence <i>Supervised student</i> : Cristiano GIACOMELLI <i>Cosupervisor</i> : Luca FERRARI
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2026	MSc thesis supervisor, University of Florence <i>Project:</i> "Spectral properties of symmetric random block matrices" <i>Supervised student:</i> Alessio DONATI <i>Cosupervisor:</i> Gianmarco BET
2025-26	MSc thesis supervisor, University of Florence <i>Project:</i> "Integer partitions and cup stackings: a combinatorial problem from random matrix theory" <i>Supervised student:</i> Emmanuil KLADOS (Erasmus trainee)
2025-26	MSc thesis supervisor, University of Florence <i>Project:</i> "The semicircle law for random non-uniform hypergraphs" <i>Supervised student:</i> Eleonora BORDIGA <i>Cosupervisor:</i> Luca AVENA
2025	BSc thesis supervisor, University of Florence <i>Project:</i> "Counting trees and forests through random walks" (in Italian) <i>Supervised student:</i> Andrea FICOZZI <i>Cosupervisor:</i> Luca AVENA
2019	Undergraduate summer research project supervisor, University College Dublin <i>Project:</i> "Interacting Particle Systems, Last Passage Percolation, and Random Matrices" <i>Supervised student:</i> Shane GIBBONS (competitively selected by a departmental committee) <i>Cosupervisor:</i> Fabio D. CUNDEN

EVENT ORGANISATION

15-19 JUN 2026	INdAM workshop "Probability Models in Mathematical Physics – Integrability, asymptotics, and universality", Rome <i>Co-organisers:</i> Fabio D. CUNDEN, Giovanni GRAMEGNA, Marilena LIGABÒ
2025–PRESENT	Recurrent one-day workshop "Days in Probability and Statistical Physics", University of Florence <i>Co-organisers:</i> Luisa ANDREIS, Luca AVENA, Gianmarco BET
21-25 JUL 2025	Conference "Non-equilibrium statistical physics: mathematical and physical advances", Florence (local organiser) <i>Other members of the local organising committee:</i> Luca AVENA, Gianmarco BET, Filippo COLOMO, Cristian GIARDINÀ
15 JUL 2025	Invited session "Random matrices and combinatorial structures", 44th Conference on Stochastic Processes and their Applications, Wrocław <i>Invited participants:</i> Dimitris CHELIOTIS, Fabio D. CUNDEN, Michele SALVI

11 JUN 2024	Contributed session “Combinatorial structures in probability and statistics”, Fourth Italian Meeting on Probability and Mathematical Statistics, Rome <i>Invited participants:</i> Alejandra AVALOS PACHECO, Gianmarco BET, Fabio D. CUNDEN, Ivailo HARTARSKY
24 JUL 2023	Contributed session “Interacting Markov processes related to random matrices”, 43rd Conference on Stochastic Processes and their Applications, Lisbon <i>Invited participants:</i> Jonas ARISTA, Theo ASSIOTIS, Will FITZGERALD
17 JUN 2019	Contributed session “Random interfaces and universality”, Second Italian Meeting on Probability and Mathematical Statistics, Salerno <i>Invited participants:</i> Giuseppe CANNIZZARO, Alberto CHIARINI

ADMIN

2024–PRESENT	Erasmus+ and International Mobility Programme Coordinator for the BSc and MSc in Mathematics, University of Florence
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OUTREACH

JUL 2017	Seminar leader, <i>Science and survival</i> programme, University of Warwick Interactive seminars called “Probability in Statistical Physics” in a higher education outreach program for secondary school students.
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REFEREEING

2014–PRESENT	Referee for scientific journals and conference proceedings <i>Advances in Mathematics</i> <i>ALEA - Latin American Journal of Probability and Mathematical Statistics</i> <i>Annales de l’Institut Henri Poincaré - Probabilités et Statistiques</i> <i>Annals of Applied Probability</i> <i>Annals of Probability</i> <i>Communications in Mathematical Physics</i> <i>Electronic Journal of Probability</i> <i>ESAIM: Probability and Statistics</i> <i>Formal Power Series and Algebraic Combinatorics - proceedings</i> <i>International Mathematics Research Notices</i> <i>Journal of Statistical Physics</i> <i>Mathematical Physics, Analysis and Geometry</i> <i>Probability Surveys</i> <i>Probability Theory and Related Fields</i> <i>Stochastic Processes and their Applications</i> <i>Symmetry, Integrability and Geometry: Methods and Applications</i>
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SCIENTIFIC VISITS

15-24 SEP 2025	Università di Bari <i>Collaboration with:</i> Fabio D. CUNDEN, Giovanni GRAMEGNA, Marilena LIGABÒ
3-7 JUN 2024	Università di Bari <i>Collaboration with:</i> Fabio D. CUNDEN, Giovanni GRAMEGNA, Marilena LIGABÒ
21-25 NOV 2023	King's College London <i>Collaboration with:</i> Piotr DYSZEWSKI, Nina GANTERT, Samuel G. G. JOHNSTON, Dominik SCHMID
30 JUN-6 JUL 2023	University of Warwick <i>Collaboration with:</i> Guillaume BARRAQUAND, Yuchen LIAO, Nikos ZYGOURAS
2-7 OCT 2022	University of Warwick <i>Collaboration with:</i> Yuchen LIAO, Nikos ZYGOURAS
24-30 SEP 2022	University of Bath <i>Collaboration with:</i> Samuel G. G. JOHNSTON, Dominik SCHMID

INVITED TALKS (SELECTED)

8 JUN 2026	"5th Italian Meeting on Probability and Mathematical Statistics", Session "Combinatorial structures in probability and mathematical physics", Università di Palermo <i>Can one hear the shape of a random matrix?</i>
21 MAY 2026	"Discrete Random Structures II" conference, Będlewo , Poland <i>Can one hear the shape of a random matrix?</i>
14 JUL 2025	"44th Conference on Stochastic Processes and their Applications", Session "Random partitions", Wrocław <i>Random planar trees and the Jacobian conjecture</i>
7 MAY 2025	"Giornata INdAM 2025" one-day workshop, Università Roma Tre <i>Random matrices, Young diagrams, and trees</i>
20 NOV 2024	"Mixing Times in the Kardar-Parisi-Zhang Universality Class" mini-workshop, Mathematisches Forschungsinstitut Oberwolfach <i>Random matrices, Young diagrams, and trees</i>
11 SEP 2024	UCD probability seminar, University College Dublin <i>Random matrices, Young diagrams, and trees</i>
14 JUN 2024	"Fourth Italian Meeting on Probability and Mathematical Statistics", Session "Random walks and disordered models", Università di Roma - La Sapienza <i>Non-intersecting path constructions for inhomogeneous TASEP and the KPZ fixed point</i>

8 JAN 2024	Vienna Probability Seminar, Universität Wien <i>Non-intersecting path constructions for inhomogeneous TASEP and the KPZ fixed point</i>
19 OCT 2023	“Discrete Random Structures” conference, Bedlewo , Poland <i>Random planar trees and the Jacobian conjecture</i>
7 SEP 2023	“XXII Congresso dell’Unione Matematica Italiana” (sezione di probabilità e statistica matematica), Università di Pisa and Scuola Normale Superiore <i>Probabilità su alberi e la congettura jacobiana</i>
21 JUL 2023	Munich-Augsburg Probability Colloquium, Universität Augsburg <i>Non-intersecting path constructions for inhomogeneous TASEP and the KPZ fixed point</i>
7 FEB 2023	SPASS (Seminars in Probability, Stochastic Analysis and Statistics), Università di Pisa <i>Matrix Whittaker processes</i>
06 APR 2022	UniBA Mathematical Physics Seminar, Università di Bari (online) <i>Matsumoto-Yor and Dufresne type theorems for a random walk on positive definite matrices</i>
29 Nov 2021	Meeting of the international research network PIICQ (“Integrable Probability, Classical and Quantum Integrability”), online <i>Polymer models, geometric RSK and Whittaker functions</i>
20 APR 2021	Vienna Discrete Mathematics Seminar (Arbeitsgemeinschaft “Diskrete Mathematik”), TU Wien (online) <i>Sorting networks, staircase Young tableaux and last passage percolation</i>
10 MAR 2021	Workshop on Enumerative Combinatorics 2021, University College Dublin (online) <i>Sorting networks and staircase Young tableaux</i>
6 OCT 2020	Vienna Probability Seminar, TU Wien <i>The oriented swap process and last passage percolation</i>
18 JUN 2020	Junior Integrable Probability Seminar, online <i>Random sorting networks and last passage percolation</i>
10 JAN 2020	Dipartimento di Matematica e Fisica, Università Roma Tre <i>Random sorting networks and last passage percolation</i>
25 JUN 2019	“Advances in Last Passage Percolation” workshop, University of Sussex <i>Transition between characters of classical groups, decomposition of Gelfand-Tsetlin patterns, and last passage percolation</i>

7 JUN 2019	“Virginia Integrable Probability Summer School 2019”, University of Virginia <i>Transition between characters of classical groups, decomposition of Gelfand-Tsetlin patterns, and last passage percolation</i>
14 MAY 2019	Integrable probability seminar, Massachusetts Institute of Technology <i>Transition between characters of classical groups, decomposition of Gelfand-Tsetlin patterns, and last passage percolation</i>
5 OCT 2018	“Insalate di Matematica” seminar, Università di Milano-Bicocca <i>How long does it take to go through a series of N queues?</i>
21 JUN 2018	“Randomness and Symmetry” workshop, University College Dublin <i>Point-to-line polymers via orthogonal Whittaker and symplectic Schur functions</i>
28 Nov 2017	School of Mathematics and Statistics, University College Dublin <i>Point-to-line log-gamma polymers</i>

OTHER SKILLS

LANGUAGES	Italian (native speaker) English (fluent) Spanish (fluent) German (basic) French (basic)
SOFTWARE	LaTeX Matlab Mathematica