

Elia BISI, PhD

ASSISTANT PROFESSOR (FIXED-TERM), TECHNISCHE UNIVERSITÄT WIEN

✉ OFFICE: Technische Universität Wien, Institut für Stochastik und Wirtschaftsmathematik,
E 105-07, Wiedner Hauptstraße 8-10, 1040 Vienna (Austria)

☎ +43 1 58801 105773 | @ elia.bisi@tuwien.ac.at | 🏠 eliabisi.com | [in](https://www.linkedin.com/company/elia-bisi) [elia-bisi](https://www.linkedin.com/company/elia-bisi)

Last update: 20th January 2023.

WORK EXPERIENCE

- | | |
|---------------------|--|
| SEP 2020 - PRESENT | Fixed-term Assistant Professor (Universitätsassistent), Technische Universität Wien , Institute of Statistics and Mathematical Methods in Economics
<i>Research unit:</i> Mathematical Stochastics |
| 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, STMicronics , 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</i> exchange year, Universidad Autónoma de Madrid , 2012-2013
<i>Final mark:</i> 110/110 <i>cum laude</i> |
| OCT 2008 - Nov 2011 | BSc. in MATHEMATICS, Università di Milano-Bicocca
<i>Final mark:</i> 110/110 <i>cum laude</i> |

AWARDS AND GRANTS

- | | |
|------|--|
| 2022 | Member of the Focused Research Grant "A graph-theoretic approach to the Jacobian conjecture"
Awarded by the Heilbronn Institute for Mathematical Research.
<i>Principal investigator:</i> S.G.G. Johnston.
<i>Other members:</i> P. Dyszewski, N. Gantert, J. Prochno, D. Schmid. |
|------|--|

2017	Prize <i>Giving to Warwick</i> , University of Warwick Awarded for an “outstanding contribution by PhD students to the Statistics Department’s teaching programme”.
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 Awarded by the Department of Statistics at Warwick.

PUBLICATIONS AND PREPRINTS

- [1] E. BISI, P. DYSZEWSKI, N. GANTERT, S. G. G. JOHNSTON, J. PROCHNO, and D. SCHMID. **Random planar trees and the Jacobian conjecture** (2023). arXiv: [2301.08221](https://arxiv.org/abs/2301.08221).
- [2] E. BISI, Y. LIAO, A. SAENZ, and N. ZYGOURAS. **Non-intersecting path constructions for TASEP with inhomogeneous rates and the KPZ fixed point** (2022). arXiv: [2208.13580](https://arxiv.org/abs/2208.13580).
- [3] J. ARISTA, E. BISI, and N. O’CONNELL. **Matrix Whittaker processes** (2022). arXiv: [2203.14868](https://arxiv.org/abs/2203.14868).
- [4] J. ARISTA, E. BISI, and N. O’CONNELL. **Matsumoto-Yor and Dufresne type theorems for a random walk on positive definite matrices**. *Annales de l’Institut Henri Poincaré - Probabilités et Statistiques* (2022). Accepted. arXiv: [2112.12558](https://arxiv.org/abs/2112.12558).
- [5] 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. URL: <https://doi.org/10.1016/j.aim.2022.108453>.
- [6] 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. URL: <https://doi.org/10.1002/rsa.21055>.
- [7] 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. URL: <https://doi.org/10.1007/s00029-021-00712-8>.
- [8] 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*, #3. URL: <https://www.mat.univie.ac.at/~slc/wpapers/FPSAC2020/3.html>.
- [9] E. BISI and N. ZYGOURAS. **GOE and Airy_{2→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. KONIG, C. MUKHERJEE, and O. STEFANO. Berlin: Springer, 2019. URL: https://doi.org/10.1007/978-3-030-15338-0_7.
- [10] 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. URL: <https://doi.org/10.1090/tran/7423>.

- [11] 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. URL: <https://doi.org/10.1109/TC.2016.2635650s>.

SELECTED TALKS

Invited talks

- | | |
|----------------|---|
| 15-21 OCT 2023 | “Discrete Random Structures” conference, Bedlewo , Poland.
Title: TBA. |
| 4-9 SEP 2023 | XXII Congresso dell’Unione Matematica Italiana (sezione di probabilità e statistica matematica), University of Pisa and Scuola Normale Superiore .
<i>Probability on trees and the Jacobian conjecture</i> |
| 19 MAY 2022 | (Not So) Informal Probability Seminar, Universität Wien
<i>Matrix Whittaker processes</i> |
| 06 APR 2022 | UniBA Mathematical Physics Seminar, online
<i>Matsumoto-Yor and Dufresne type theorems for a random walk on positive definite matrices</i> |
| 29 Nov 2021 | PIICQ (“Integrable Probability, Classical and Quantum Integrability”) meeting, online
<i>Polymer models, geometric RSK and Whittaker functions</i> |
| 20 APR 2021 | Vienna Discrete Mathematics Seminar (Arbeitsgemeinschaft “Diskrete Mathematik”), 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, Technische Universität 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**
Transition between characters of classical groups, decomposition of Gelfand-Tsetlin patterns, and last passage percolation
- 14 MAY 2019 | Integrable probability seminar, **Massachusetts Institute of Technology**, Department of Mathematics
Transition between characters of classical groups, decomposition of Gelfand-Tsetlin patterns, and last passage percolation
- 5 OCT 2018 | “Insalate di Matematica” seminar, **Università di Milano-Bicocca**, Dipartimento di Matematica e Applicazioni
How long does it take to go through a series of N queues?
- 21 JUN 2018 | “Randomness and Symmetry” workshop, **University College Dublin**
Point-to-line polymers via orthogonal Whittaker and symplectic Schur functions
- 28 Nov 2017 | School of Mathematics and Statistics, **University College Dublin**
Point-to-line log-gamma polymers

Contributed talks

- 5 JUL 2022 | “Algorithmic and Enumerative Combinatorics conference”, **TU Wien**
Transition between characters of classical groups, decomposition of Gelfand-Tsetlin patterns and last passage percolation
- 26 AUG 2020 | “Bernoulli-IMS One World Symposium 2020”, **online** (prerecorded talk and live discussion)
The geometric Burge correspondence and the partition function of polymer replicas
- 17 JUN 2019 | “Second Italian Meeting on Probability and Mathematical Statistics”, **Salerno, Italy**
Corner growth model, symplectic characters, and KPZ universality
- 8 MAY 2018 | “Young researchers’ meeting” seminar, **University of Warwick**, Dep. of Statistics
A central limit theorem for point-to-line last passage percolation
- 13 APR 2018 | “2018 UK Easter Probability meeting”, **University of Sheffield**
Point-to-line last passage percolation via symplectic Schur functions
- 7 Nov 2017 | Mathematical physics and probability seminar, **University of Warwick**
Point-to-line polymers and orthogonal Whittaker functions
- 29 Nov 2016 | Statistics PhD open day, **University of Warwick**
A few probabilistic models in the KPZ universality class

Posters

- 7 JUN 2022 | “Random Matrices and Beyond - A conference in celebration of Kurt Johanson’s 60th birthday”, **KTH Stockholm**
Matrix Whittaker processes
- 9 APR 2019 | “Integrability and Randomness in Mathematical Physics and Geometry” workshop, **CIRM Marseille**
Transition between characters of classical groups, decomposition of Gelfand-Tsetlin patterns, and last passage percolation

SERVICE ACTIVITIES

- 2014 - PRESENT | Referee for scientific journals and conference proceedings
ALEA - Latin American Journal of Probability and Mathematical Statistics
Annales de l’Institut Henri Poincaré - Probabilités et Statistiques
Annals of Applied Probability
Annals of Probability
Electronic Journal of Probability
Formal Power Series and Algebraic Combinatorics - proceedings
International Mathematical Research Notices
Probability Surveys
Probability Theory and Related Fields
Symmetry, Integrability and Geometry: Methods and Applications
- JUN 2019 | Organiser of the session “Random interfaces and universality”, Second Italian Meeting on Probability and Mathematical Statistics, Salerno.
- JUL 2017 | Seminar leader, *Science and survival* program, **University of Warwick**
Interactive seminars called “Probability in Statistical Physics” in a higher education outreach program for secondary school students.

TEACHING AND MENTORING EXPERIENCE

- 2020 - PRESENT | Lecturer, **Technische Universität Wien**
Theory of Stochastic Processes (2022-2023, sem. 2)
Seminar in Probability Theory on: longest increasing subsequences in random permutations (2020-2021, sem. 2)
- 2020 - PRESENT | Instructor of problem classes, **Technische Universität Wien**
Measure and Probability Theory 2 (2022-2023, sem. 1)
Theory of Stochastic Processes (2020-2021, sem. 2; 2021-2022, sem. 2; 2022-2023, sem. 2)
Mathematical Statistics (2021-2022, sem. 1; 2022-2023, sem. 1)
- 2019 | Substitute lecturer, **University College Dublin**
Probability Theory (2019-2020, sem. 1)

- 2019 | Research project supervisor, **University College Dublin**
Undergraduate summer research project: "Interacting Particle Systems, Last Passage Percolation, and Random Matrices"
Supervised student: Shane Gibbons
Cosupervisor: Fabio Deelan Cunden
- 2015 - 2018 | Teaching assistant, **University of Warwick**
Probability Theory (2016-2017, term 2; 2017-2018, term 2)
Mathematical Methods (2017-2018, term 1)
Mathematics of Random Events (2016-2017, term 1)
Stochastic Processes (2015-2016, term 2)
Mathematical Techniques (2015-2016, term 1)
Probability A & B (2014-2015, term 2)

OTHER SKILLS

LANGUAGES | Italian (native speaker)
 English (fluent)
 Spanish (fluent)
 German (basic)
 French (basic)

SOFTWARE | LaTeX
 Matlab
 Mathematica