

# Elia BISI, PhD

ASSISTANT PROFESSOR (NON-TENURED), TECHNISCHE UNIVERSITÄT WIEN

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## WORK EXPERIENCE

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| SEPT 2020 - PRESENT  | Assistant Professor (non-tenured), <b>Technische Universität Wien</b> ,<br>Institut für Stochastik und Wirtschaftsmathematik<br>Member of the research unit “Mathematical Stochastics”.                  |
| JULY 2018 - AUG 2020 | Research Scientist (postdoctoral fellow), <b>University College<br/>Dublin</b> , School of Mathematics and Statistics<br><i>Funding</i> : ERC grant “Integrable random structures” (PI: Neil O’Connell). |
| MAR 2014 - SEP 2014  | Research intern, <b>STMicroelectronics</b> , Agrate Brianza (Italy)<br>Advanced System Technology, Security Lab, Cryptography group.   |

## HIGHER EDUCATION

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| OCT 2014 - JULY 2018 | Ph.D. in STATISTICS, <b>University of Warwick</b><br><i>Thesis</i> : “Random polymers via orthogonal Whittaker and symplectic<br>Schur functions” – defended on 3 Oct 2018.<br><i>Supervisor</i> : Prof. Nikos ZYGOURAS.  |
| OCT 2011 - Nov 2013  | MSc. in MATHEMATICS, <b>Università di Milano-Bicocca</b><br><i>Erasmus</i> exchange year, <b>Universidad Autónoma de Madrid</b> , 2012-2013.<br><i>Dissertation</i> : “Large deviations” (supervised by Francesco CARAVENNA).<br><i>Final mark</i> : 110/110 <i>cum laude</i> . |
| OCT 2008 - Nov 2011  | BSc. in MATHEMATICS, <b>Università di Milano-Bicocca</b><br><i>Dissertation</i> : “Composition algebras” (supervised by Lino DI MARTINO).<br><i>Final mark</i> : 110/110 <i>cum laude</i> .   |

## PUBLICATIONS AND PREPRINTS

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- [1] E. BISI, F. D. CUNDEN, S. GIBBONS, and D. ROMIK. **The oriented swap process and last passage percolation** (2020). Submitted. arXiv: [2005.02043](https://arxiv.org/abs/2005.02043).
- [2] E. BISI, N. O’CONNELL, and N. ZYGOURAS. **The geometric Burge correspondence and the partition function of polymer replicas** (2020). Submitted. arXiv: [2001.09145](https://arxiv.org/abs/2001.09145).
- [3] 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.
- [4] E. BISI and N. ZYGOURAS. **Transition between characters of classical groups, decom-**

**position of Gelfand-Tsetlin patterns and last passage percolation** (2019). Submitted. arXiv: [1905.09756](https://arxiv.org/abs/1905.09756).

- [5] E. BISI. **Random polymers via orthogonal Whittaker and symplectic Schur functions**. PhD thesis. University of Warwick, 2018. URL: <http://wrap.warwick.ac.uk/121448/>.
- [6] 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. KONIG, C. MUKHERJEE, and O. STEFANO. Berlin: Springer, 2019.
- [7] E. BISI and N. ZYGOURAS. **Point-to-line polymers and orthogonal Whittaker functions**. *Trans. Am. Math. Soc.* 371.12 (2019), pp. 8339–8379.
- [8] E. BISI, F. MELZANI, and V. ZACCARIA. **Symbolic analysis of higher-order side channel countermeasures**. *IEEE Transactions on Computers* 666.6 (2017), pp. 1099–1105.

## AWARDS AND GRANTS

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2017	Prize Giving to Warwick, <b>University of Warwick</b> Awarded for an “outstanding contribution by PhD students to the Statistics’s Department’s teaching programme”.
OCT 2014 - MAR 2018	EPSRC scholarship, <b>University of Warwick</b> Covering PhD fees. Awarded by the Engineering and Physical Sciences Research Council (EPSRC).
OCT 2014 - MAR 2018	PhD maintenance bursary, <b>University of Warwick</b> Awarded by the Department of Statistics at Warwick.

## SELECTED TALKS

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### *Invited talks*

6 OCT 2020	Vienna Probability Seminar, <b>Technische Universität Wien</b> <i>The oriented swap process and last passage percolation.</i>
18 JUNE 2020	Junior Integrable Probability Seminar, <b>online</b> <i>Random sorting networks and last passage percolation.</i>
10 JAN 2020	Dipartimento di Matematica e Fisica, <b>Università Roma Tre</b> <i>Random sorting networks and last passage percolation.</i>
25 JUNE 2019	“Advances in Last Passage Percolation” workshop, <b>University of Sussex</b> <i>Transition between characters of classical groups, decomposition of Gelfand-Tsetlin patterns, and last passage percolation.</i>
7 JUNE 2019	“Virginia Integrable Probability Summer School 2019”, <b>University of Virginia</b> <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**, 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 JUNE 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*

- 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 JUNE 2019 | “Second Italian Meeting on Probability and Mathematical Statistics”, **Salerno**  
*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*

- 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 (poster).*

### *Seminar series in reading groups*

- SEPT-JAN 2020 | **Technische Universität Wien**, research unit Mathematical Stochastics  
*Determinantal point processes, random matrices and random partitions.*

- FEB 2019 | **University College Dublin**, School of Mathematics and Statistics  
*Automorphic forms and Whittaker functions on  $GL(2, \mathbb{R})$ .*
- OCT-NOV 2016 | **University of Warwick**, Mathematics institute  
*Fredholm determinants and applications to probability.*
- FEB-MAR 2016 | **University of Warwick**, Mathematics institute  
*Representation theory of Lie groups and Weyl character formula.*
- NOV 2014 | **University of Warwick**, Mathematics institute  
*Robinson-Schensted-Knuth correspondence and last passage percolation.*

## TEACHING AND MENTORING EXPERIENCE

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- OCT - NOV 2019 | Substitute lecturer for the module *Probability Theory*, **University College Dublin**, School of Mathematics and Statistics
- JUNE - JULY 2019 | Supervisor of an undergraduate summer research project, **University College Dublin**, School of Mathematics and Statistics  
*Project title: "Interacting Particle Systems, Last Passage Percolation, and Random Matrices".*  
*Supervised student: Shane Gibbons.*  
*Cosupervisor: Fabio Deelan Cunden.*
- JUNE 2016 | Exam marker, **University of Warwick**, Department of Statistics  
Module: *Stochastic Processes.*
- JAN 2015 - MAR 2018 | Teaching assistant, **University of Warwick**, Department of Statistics  
Modules: *Probability A & B, Mathematical Techniques, Stochastic Processes, Mathematics of Random Events, Probability Theory, Mathematical Methods.*
- JAN 2012 - SEPT 2014 | Teacher of Mathematics, Milan area (Italy)  
Private classes for high school and undergraduate students.

## SERVICE ACTIVITIES

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- SINCE 2014 | Referee for scientific journals such as *Annals of Applied Probability* and conference proceedings such as *Formal Power Series and Algebraic Combinatorics.*
- JUN 2019 | Organiser of the session "Random interfaces and universality", Second Italian Meeting on Probability and Mathematical Statistics, Salerno.
- JULY 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.

## CONFERENCES AND RESEARCH SCHOOLS ATTENDED

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24-28 AUG 2020	"Bernoulli-IMS One World Symposium 2020", online.
27-31 JULY 2020	"CMI-HIMR Integrable Probability Online Summer School", online.
22-24 AUG 2019	"Representation Theory, Probability, and Symmetric Functions", MIT.
24-27 JUNE 2019	"Advances in Last Passage Percolation", University of Sussex.
17-20 JUNE 2019	"Second Italian Meeting on Probability and Mathematical Statistics", Salerno (Italy).
27 MAY - 8 JUNE 2019	"Virginia Integrable Probability Summer School 2019", University of Virginia.
8-12 APR 2019	"Integrability and Randomness in Mathematical Physics and Geometry", CIRM Marseille.
10 SEPT 2018	"Markovianity and Symmetry", University College Cork.
18-22 JUNE 2018	"Randomness and Symmetry", University College Dublin.
11-15 JUNE 2018	"Universality in Probability Theory and Statistical Mechanics", Ischia (Italy).
9-13 APR 2018	"2018 UK Easter Probability meeting", University of Sheffield.
18 OCT 2017	"Discrete Models and KPZ Universality", Durham University.
24-28 APR 2017	"Qualitative Methods in KPZ Universality", CIRM Marseille.
3-15 JULY 2016	"46th Probability Summer School", Saint Flour.
29 MAR - 2 APR 2016	"Probabilistic models - from discrete to continuous", University of Warwick.
6-10 JULY 2015	"Developments in Modern Probability", LMS-CMI Research School, University of Oxford.
25-29 MAY 2015	"Random Polymers and Algebraic Combinatorics", University of Oxford.

## SKILLS

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

SOFTWARE | LaTeX, Matlab, Mathematica.