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Date of birth: June 29, 1975

Place of birth: Klagenfurt, Austria.

Education

2006 **Habilitation in Mathematics**, *Universität Wien*.

Thesis A polynomial method for the enumeration of plane partitions and alternating sign matrices

External Referees David Bressoud, Dominique Foata, Charles Little, Peter Paule and Doron Zeilberger

Internal Referees Markus Fulmek, Christian Krattenthaler, Michael Schlosser and Liselotte Tschepen

2000 **Dr. rer. nat in Mathematics**, *Universität Wien*, passed with distinction.

Thesis Enumeration of perfect matchings: Rhombus tilings and Pfaffian graphs

Supervisors Christian Krattenthaler and Franz Rendl

1998 **Mag. rer. nat in Mathematics**, *Universität Wien*, passed with distinction.

Thesis Der Satz von Skolem, Mahler, Lech – ein Ergebnis über die Nullstellen linearer Rekursionsfolgen

Supervisor Johann Cigler

1993 – 1998 **Studies of “Mathematics”**, *Universität Wien*.

1993 **Matura**, *Ingeborg-Bachmann-Gymnasium*, Klagenfurt.

Academic Employment

since 2011 **Assoziierte Professorin**, *Universität Wien*.

2009 **Visiting professor**, *Alpen-Adria-Universität Klagenfurt*.

2007 **Visiting professor**, *Alpen-Adria-Universität Klagenfurt*.

2004-2011 **Universitätsassistentin**, *Universität Wien*.

Permanent position since 2008

2002 **Visiting researcher**, *Universität Wien*.

2001 **Visiting scholar**, *Georgia Tech, MIT, Michigan State University*.

- 1999-2004 **Universitätsassistentin**, *Alpen-Adria-Universität Klagenfurt*.
1998-1999 **Research fellow**, *Universität Wien*.
1995-1999 **Teaching assistant**, *Universität Wien*.

Awards

- 2009 **START Award**, *Austrian Federal Ministry of Science and Research and Austrian Science Foundation FWF*, €1.2 Mill, The START Award is the most prestigious award for young researchers in Austria.

Research Grants

- 2010 – 2018) **Principal Investigator of the START project**, *Austrian Science Foundation (FWF)*.
2006 – 2011 **Co-Investigator of the National Research Network “Analytic Combinatorics and Probabilistic Number Theory”**, *Austrian Science Foundation (FWF)*.
2002 – 2005 **Co-Investigator of the European Research Network “Algebraic Combinatorics in Europe”**, *European Commission*.

Research interests

Combinatorics (enumerative, algebraic, bijective) and its relations to statistical physics and algebra, Graph Theory.

Publications

- [0] I. Fischer, Enumeration of perfect matchings: Rhombus tilings and Pfaffian graphs, Dissertation, Vienna 2000.
[1] I. Fischer, Enumeration of rhombus tilings which contain a fixed rhombus in the centre, *J. Combin. Theory Ser. A* 96 (2001), 31–88.
[2] C.H.C. Little, F. Rendl and I. Fischer, Towards a characterisation of Pfaffian near bipartite graphs, *Discrete Math.* 244 (2002), 279–297.
[3] I. Fischer and C.H.C. Little, A characterisation of Pfaffian near bipartite graphs, *J. Combin. Theory Ser. B* 82 (2001), 175–222.
[4] I. Fischer, Moments of inertia associated with the lozenge tilings of a hexagon, *Sém. Lothar. Combin.* 45 (2000/01), Art. B45f, 14 pp.
[5] I. Fischer, A symmetry theorem on a modified jeu de taquin, *European J. Combin.* 23 (2002), 929–936.
[6] I. Fischer and C.H.C. Little, Even circuits of prescribed clockwise parity, *Electron. J. Combin.* 10 (2003), Article # R 45, 20 pages.
[7] I. Fischer, A method for proving polynomial enumeration formulas, *J. Combin. Theory Ser. A* 111 (2005), 37 – 58.
[7a] I. Fischer, A method for proving polynomial enumeration formulas (extend abstract), Proceedings of FPSAC 03 (talk).
[8] I. Fischer, A polynomial method for the enumeration of plane partitions and alternating sign matrices, Habilitation thesis, Vienna 2005.

- [9] I. Fischer, G. Gruber, F. Rendl and R. Sotirov, Computational experience with a bundle approach for semidefinite cutting plane relaxations of Max-Cut and Equipartition, *Math. Program. Ser. B.* 105 (2006), 451 – 469.
- [10] I. Fischer, Another refinement of the Bender-Knuth (ex-)Conjecture, *Euro-pean J. Combin.* 27 (2006), 290 – 321.
- [11] I. Fischer, The number of monotone triangles with prescribed bottom row, *Adv. Appl. Math.* 37 (2006), no. 2, 249 – 267.
- [11a] I. Fischer, The number of monotone triangles with prescribed bottom row (extended), Proceedings of FPSAC 05 (poster), DMTCS proceedings.
- [12] I. Fischer, A new proof of the refined alternating sign matrix theorem, *J. Combin. Theory Ser. A.* 114 (2007), no. 2, 253 – 264.
- [13] I. Fischer, An operator formula for the number of halved monotone triangles with prescribed bottom row, *J. Combin. Theory Ser A.* 116 (2009), 515 – 538.
- [14] I. Fischer and D. Romik, More refined enumerations of alternating sign matrices, *Adv. Math.* 222 (2009), 2004 – 2035.
- [15] I. Fischer, The operator formula for monotone triangle – simplified proof and three generalizations, *J. Combin. Theory Ser A.* 117 (2010), 1143 – 1157.
- [16] I. Fischer, Refined enumerations of alternating sign matrices: monotone (d, m) -trapezoids with prescribed top and bottom row, *J. Alg. Combin.* 33 (2011), 239 – 257.
- [17] I. Fischer, Linear relations of refined enumerations of alternating sign matrices, *J. Combin. Theory Ser. A.* 119 (2012), 556 – 578.
- [18] I. Fischer, Sequences of labeled trees related to Gelfand-Tsetlin patterns, *Adv. Appl. Math.* 49 (2012), 165 – 195.
- [19] I. Fischer and L. Riegler, Combinatorial reciprocity for monotone triangles, *J. Combin. Theory Ser A* 120 (2013), 1372 – 1393.
- [19a] I. Fischer and L. Riegler, Combinatorial reciprocity for monotone triangles (extended abstract), Proceedings of FPSAC 12 (talk), DMTCS proceedings.
- [20] M. Ciucu and I. Fischer, A triangular gap of size two in a sea of dimers in a 60 degree angle, *J. Phys. A.* 45 (special issue, 2012).
- [21] I. Fischer and P. Nadeau, Fully Packed Loops in a triangle: matchings, paths and puzzles, *J. Combin. Theory Ser A* 130 (2015), 64 – 118.
- [22] I. Fischer and M. Kubitzke, Spectra and eigenvectors of the Segre transformation, *Adv. Appl. Math.* 56 (2014), 64 – 118.
- [23] M. Ciucu and I. Fischer, Proof of two conjectures of Ciucu and Krattenthaler on the enumeration of lozenge tilings of hexagons with cut off corners, *J. Combin. Theory Ser A* 133 (2015), 228 – 250.
- [24] I. Fischer and L. Riegler, Vertically symmetric alternating sign matrices and a multivariate Laurent polynomial identity, *Elect. J. Combin.* 22 (2015), 32 pages.

- [25] S. Beil, I. Fischer and P. Nadeau, Wieland gyration for triangular fully packed loop configurations, *Elect. J. Combin.* 22 (2015), 17 pages.
- [26] M. Ciucu and I. Fischer, Lozenge tilings of hexagons with arbitrary dents, *Adv. Appl. Math.* 73 (2016), 1-22.
- [27] I. Fischer, Counting integer points in polytopes associated with directed graphs, accepted by *Adv. Appl. Math.*.
- [29a] R. Behrend, I. Fischer and Matjaž Konvalinka, Diagonally and antidiagonally symmetric alternating sign matrices of odd order (extended abstract), Proceedings of FPSAC 16, DMTCS proceedings.

Preprints and Work in Progress

- [28] I. Fischer, A bijective proof of the hook-length formula for shifted standard tableaux, preprint, 47 pages, [math.CO/0112261](https://arxiv.org/abs/math/0112261).
- [29] R. Behrend, I. Fischer and Matjaž Konvalinka, Diagonally and antidiagonally symmetric alternating sign matrices of odd order, submitted, [arXiv:1512.06030](https://arxiv.org/abs/1512.06030).
- [30] I. Fischer, Short proof of the ASM theorem avoiding the six-vertex model.
- [31] A. Ayyer, R. Behrend and I. Fischer, Extreme diagonally and antidiagonally alternating sign matrices of odd order.

Supervision of Students and PostDocs

Diploma students

- 2009 Liselotte Tschepen, "*Counting integral points in polytopes*".
- 2010 Thomas Glatz, "*Charakterisierung Pfaff'scher Graphen mittels verbotener Teilgraphen*".

Master students

- 2015 Christof Ender, "*Fully packed loop configurations*".
- 2016 Hans Höngesberg, *in progress*.

Doctoral students

- 2010-2014 Lukas Riegler, "*Simple enumeration formulae related to Alternating Sign Matrices, Monotone Triangles and standard Young tableaux*".
- 2012-2016 Sabine Beil, *in progress*.
- since 2015 Florian Aigner.
- since 2015 Manjil Saikia.

Postdoctoral fellows

- 2010 – 2011 Matthieu Josuat-Vergès, (*now CNRS*).
- 2010 – 2012 Martina Kubitzke, (*now Goethe Universität Frankfurt am Main*).
- since 2015 Yvonne Kemper.

Selected Presentations

- June 2000 10th SIAM Conference on Discrete Mathematics, Minneapolis.
- October 2001 Combinatorics Seminar, Georgia Institute of Technology, invited talk.
- December 2001 Combinatorics Seminar, Michigan State University, invited talk.
- June 2003 15th Conference on Formal Power Series and Algebraic Combinatorics, Linköping University.
- September 2003 European Conference on Combinatorics, Graph Theory and Applications, Prague.
- May 2004 Mathematisches Kolloquium, Universität Wien, invited talk.
- June 2005 Second Joint Meeting of AMS, DMV and ÖMG, Mainz, invited talk.
- November 2005 Universität zu Köln, invited talk.
- December 2005 Colloquium on Discrete Mathematics, Graz University of Technology, invited talk.
- March 2006 Technische Universität Berlin, Symposium Diskrete Mathematik 2006, plenary talk.
- April 2008 Freie Universität Berlin, Hearing for a W2/W3 professorship.
- May 2009 Tilburg University, invited talk.
- January 2010 Joint Mathematical Conference CSASC 2010, Prague, plenary talk.
- June 2011 23rd Annual International Conference on Formal Power Series and Algebraic Combinatorics, Reykjavik, plenary talk.
- January 2012 Lecture to introduce me as an Assoz. Prof. at the Universität Wien.
- June 2013 Joint Mathematical Conference CSASC 2013, Koper, invited talk.
- November 2013 Kolloquium über Kombinatorik, plenary talk.
- December 2013 Workshop on Combinatorial physics at Cardiff University, invited talk.
- March 2014 Workshop “Enumerative combinatorics” at Oberwolfach, invited talk.
- June 2014 Workshop on “2D-Quantum Gravity and Statistical Mechanics” at ESI Vienna, invited talk.
- June 2015 2015 International Meeting AMS/EMS/SPM, invited talk.
- October 2015 Opening of the second phase of the doctoral school at Graz University of Technology, keynote speaker .
- January 2016 Mathematisches Kolloquium, Universität Wien.
- March 2016 Colloquium talk at Indiana University, Bloomington.

Teaching

I am active in teaching since 1999 at the Universities of Vienna and Klagenfurt.

Courses on Discrete Mathematics, Combinatorics, Graph Theory, Operations Research, Introduction to Mathematics, Mathematics of Finance, Aspects of Mathematics, and numerous problems sessions for mathematicians, computer scientists, physicists and future teachers.

Selected Administrative Activities

- 2002 **Member of the organizing committee of the International Conference on Operations Research 2002**, *Alpen-Adria Universität Klagenfurt*.
- 2003 – 2009 **Deputy secretary of the Austrian Mathematical Society ÖMG.**
- 2005 **Member of the organizing committee of the ACE Summer School on Geometric Combinatorics**, *Universität Wien*.
- since 2004 **Member of several administrative committees: Fakultätskonferenz, Studienkonferenz (Ersatzmitglied), Senat (Ersatzmitglied), several hiring committees and habilitation committees**, *Universität Wien*.
- since 2006 **Several activities for the advancement of women in mathematics.**