

Ilse Fischer

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Fakultät für
Mathematik
Nordbergstraße 15
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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 Tscheppen

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

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

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

since 2004 **Universitätsassistentin**, *Universität Wien*.

Permanent position since 2008

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

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*, €1.2 Mill.
2006 **Dr. Maria Schaumayer Preis**, *Schaumayerstiftung*.

Research Grants

- 2010 – 2015 **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)*.

Selected Activities

- 2002 **Member of the organizing committee of the International Conference on Operations Research 2002**, *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**, *Vienna*.
since 2006 **Several activities for the advancement of women in mathematics**, *Fakultät für Mathematik / Universität Wien*.

Publications

- [1] **I. Fischer**, Enumeration of perfect matchings: Rhombus tilings and Pfaffian graphs, *Dissertation*, Vienna 2000.
- [2] **I. Fischer**, Enumeration of rhombus tilings which contain a fixed rhombus in the centre, *J. Combin. Theory Ser. A* 96 (2001), no.1, 31–88.
- [3] **C.H.C. Little, F. Rendl and I. Fischer**, Towards a characterisation of Pfaffian near bipartite graphs, *Discrete Math.* 244 (2002), 279–297.
- [4] **I. Fischer and C.H.C. Little**, A characterisation of Pfaffian near bipartite graphs, *J. Combin. Theory Ser. B* 82 (2001), no.2, 175–222.
- [5] **I. Fischer**, Moments of inertia associated with the lozenge tilings of a hexagon, *Sém. Lothar. Combin.* 45 (2000/01), Art. B45f, 14 pp.
- [6] **I. Fischer**, A symmetry theorem on a modified jeu de taquin, *European J. Combin.* 23 (2002), 929–936.

- [7] I. Fischer and C.H.C. Little, Even circuits of prescribed clockwise parity, *Electron. J. Combin.* 10 (2003), Article # R 45, 20 pages.
- [8] I. Fischer, A method for proving polynomial enumeration formulas, *J. Combin. Theory Ser. A* 111 (2005), 37 – 58.
- [8a] I. Fischer, A method for proving polynomial enumerations formulas, extended abstract in the proceedings of the FPSAC'03.
- [9] I. Fischer, A polynomial method for the enumeration of plane partitions and alternating sign matrices, Habilitation thesis, Vienna 2005.
- [10] 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.
- [11] I. Fischer, Another refinement of the Bender-Knuth (ex-)Conjecture, *European J. Combin.* 27 (2006), 290 – 321.
- [12] I. Fischer, The number of monotone triangles with prescribed bottom row, *Adv. Appl. Math.* 37 (2006), no. 2, 249 – 267.
- [12a] I. Fischer, The number of monotone triangles with prescribed bottom row, extended abstract in the proceedings of the FPSAC'05.
- [13] I. Fischer, A new proof of the refined alternating sign matrix theorem, *J. Combin. Theory Ser. A.* 114 (2007), no. 2, 253 – 264.
- [14] I. Fischer, An operator formula for the number of halved monotone triangles with prescribed bottom row, *J. Combin. Theory Ser. A.* 116 (2009), no. 3, 515 – 538.
- [15] I. Fischer and D. Romik, More refined enumerations of alternating sign matrices, *Adv. Math.* 222 (2009), no. 5, 2004 – 2035.
- [16] I. Fischer, The operator formula for monotone triangle – simplified proof and three generalizations, *J. Combin. Theory Ser. A.* (accepted), 16 pages, arXiv:0903.4628.
- [17] I. Fischer, Refined enumerations of alternating sign matrices: monotone (d, m) -trapezoids with prescribed top and bottom row, *J. Alg. Combin.* (accepted), 16 pages, arXiv:0907.0401.
- [18] I. Fischer, A bijective proof of the hook-length formula for shifted standard tableaux, unpublished, 47 pages, math.CO/0112261.

Selected Presentations

- June 2000 10th SIAM Conference on Discrete Mathematics, Minneapolis, "*A characterisation of Pfaffian near bipartite graphs*".
- April 2001 Workshop: Novel approaches to hard discrete optimization, University of Waterloo, "*Solving hard optimization problems with linear inequality constraints using bundle methods*".
- September 2001 15th ÖMG-Kongress at the Universität Wien, "*Die Hakenlängenformel für shifted Tableaux*".
- October 2001 Combinatorics Seminar, Georgia Institute of Technology, "*A bijective proof of the hook-length formula for shifted standard tableaux*".
- December 2001 Combinatorics Seminar, Michigan State University, "*A bijective proof of the hook-length formula for shifted standard tableaux*".
- October 2002 49th Séminaire Lotharingien de Combinatoire, Ellwangen, "*A bijective proof of the hook-length formula for shifted standard tableaux*".
- June 2003 15th Conference on Formal Power Series and Algebraic Combinatorics, Linköping University, "*A method for proving polynomial enumeration formulas*".
- September 2003 European Conference on Combinatorics, Graph Theory and Applications, Prague, "*A method for proving polynomial enumeration formulas*".
- September 2003 Future Research in combinatorial optimization (Workshop), Alpen-Adria-Universität Klagenfurt, "*Polynomiale Abzählformeln*".
- September 2003 ÖMG Nachbarschaftstreffen, Bolzano, "*Eine Methode für den Beweis von polynomialen Abzählformeln*".
- December 2003 Cologne Combinatorics and Latest Optimization Research Exchange Seminar (Workshop), Universität zu Köln "*Die Geschichte der Alternierenden-Vorzeichen-Matrix-Vermutung*".
- May 2004 Mathematisches Kolloquium, Universität Wien, "*Polynomiale Abzählformeln*".
- June 2004 Lecture series "Wissenswertes aus der Mathematik", Vienna University of Technology, "*Die Geschichte der Alternierenden-Vorzeichen-Matrix-Vermutung*".
- June 2005 Second Joint Meeting of AMS, DMV and ÖMG, Mainz, "*The number of monotone triangles with prescribed bottom row – or – Halfway to a new proof of the refined alternating sign matrix theorem*".
- June 2005 17th Conference on Formal Power Series and Algebraic Combinatorics, Taormina, Sicily, poster presentation, "*The number of monotone triangles with prescribed bottom row*".
- September 2005 Mathematik 2005 (DMV/ÖMG Jahrestagung), Alpen-Adria-Universität Klagenfurt, "*A new proof of the alternating sign matrix theorem*".
- September 2005 Mathematik 2005 (DMV/ÖMG Jahrestagung), Alpen-Adria-Universität Klagenfurt, Schüler/innen/tag, "*Die Mathematik des Käse-Kästchen-Spiels*".
- November 2005 Universität zu Köln, "*Eine polynomiale Methode für die Abzählung von Plane Partitions und alternierenden Vorzeichenmatrizen*".

- December 2005 **Alpen-Adria-Universität Klagenfurt, “Eine polynomiale Methode für die Abzählung von Plane Partitions und alternierenden Vorzeichenmatrizen”.**
- December 2005 **Colloquium on Discrete Mathematics, Graz University of Technology, “Eine polynomiale Methode für die Abzählung von Plane Partitions und alternierenden Vorzeichenmatrizen”.**
- December 2005 **Universität Wien, Habilitation, “Eine polynomiale Methode für die Abzählung von Plane Partitions und alternierenden Vorzeichenmatrizen”.**
- March 2006 **Technische Universität Berlin, Symposium Diskrete Mathematik 2006, “A new proof of the refined alternating sign matrix theorem”, plenary talk.**
- August 2007 **Saalbach-Hinterglemm, Summerschool on mathematics for highschool students 2007, “Graphen müssen nicht immer Funktionen darstellen”.**
- September 2007 **Slovak-Austrian Mathematical Congress, Podbanske, Slovakia, “Vertically symmetric alternating sign matrices, halved monotone triangles and operator formulas”.**
- April 2008 **Freie Universität Berlin, “Die Faszination von Plane Partitions und Alternierenden Vorzeichenmatrizen”, Hearing for a W2/W3 professorship.**
- Mai 2008 **University of Natural Resources and Applied Life Sciences, Vienna, “Plane Partitions, alternierende Vorzeichenmatrizen und die mehrdimensionale Partitionsfunktion”.**
- June 2008 **University of Leoben, “Plane Partitions, alternierende Vorzeichenmatrizen und die mehrdimensionale Partitionsfunktion” .**
- May 2009 **Tilburg University, “More refined enumerations of alternating sign matrices”.**
- June 2009 **Alpen-Adria-Universität Klagenfurt, “Verfeinerte Abzählungen von alternierenden Vorzeichenmatrizen”.**
- September 2009 **ÖMG/DMV Kongress, Graz University of Technology, “More refined enumerations of alternating sign matrices”.**
- January 2010 **Joint Mathematical Conference CSASC 2010, Prague, “Refined enumerations of alternating sign matrices”, plenary talk.**

Selected Teaching

Active in teaching since 1999 at the Universities of Vienna and Klagenfurt.

Courses on Combinatorics, Graph Theory, Operations Research, Linear Algebra (and a few others) for mathematicians as wells as for computer scientists, physicists and teachers; a selection is given below.

- 2010 “Einführung in das mathematische Arbeiten”, 3 lessons per week.
- 2009 “Operations Research 1”, 2+1 lessons per week.
- 2009 “Seminar Operations Research”, 2 lessons per week.
- 2008 “Graphentheorie”, 2 lessons per week.

2008 **“Seminar: Lectures on Polytopes”**, 2 lessons per week.

2006 **“Diskrete Mathematik”**, 2+1 lessons per week.

2005 **“Matchingtheorie”**, 2 lessons per week.

2002 **“Seminar (Algebra)”**, 2 lessons per week.

2001 **“Finanzmathematik”**, 3+1 lessons per week.

2000, 2002,
2003, 2007 **“Kombinatorik und Graphentheorie”**, 3+1 lessons per week.

Supervision of
diploma
students **I have supervised one diploma student (Liselotte Tschepen; “Counting Integral Points in Polytopes”) so far and I am currently supervising another diploma student (Thomas Glatz; “Charakterisierung Pfaffscher Graphen” mittels verbotener Teilgraphen).**