

Curriculum Vitae

Andrew Daniel Rechnitzer

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Personal Details

- Date of birth: 4th February 1974
- Citizenship: Australian
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Qualifications

- (1997–2001) PhD in Mathematics
The University of Melbourne
“Some problems in the counting of lattice animals, polyominoes, polygons and walks”
Thesis submitted in 2000 and the degree was awarded in 2001.
- (1992–1996) Bachelor of Science (Hons), Mathematics
The University of Melbourne

Distinctions and Awards

- 2002 — Australian Postdoctoral Fellowship from the Australian Research Council
- 1998 — Postgraduate Overseas Research Experience Award from the University of Melbourne to study part of my PhD at LaBRI, Université Bordeaux 1.
- 1997 — Australian Postgraduate Award
- 1995 — Dean’s Honours List in Bachelor of Science

Research Experience

○ Australian Postdoctoral Fellow

2002–present Australian Research Council Australian Postdoctoral Fellow in the Statistical Mechanics and Combinatorics research group in the Department of Mathematics and Statistics at the University of Melbourne. Also an Associate Research Fellow at the Australian Research Council Centre for Excellence in the Mathematics and Statistics of Complex Systems.

○ Postdoctoral Fellow

2000–2002 Postdoctoral research fellow both in Mathematics at York University working with Professor Buks van Rensburg and also in Chemistry at the University of Toronto working with Professor Stu Whittington.

○ PhD Student

1997–2000 PhD student in the Statistical Mechanics and Combinatorics research group in the Department of Mathematics and Statistics at the University of Melbourne. Awarded an Australian Postgraduate Award.

○ Doctoral Studies

1998–1999 Studied for 1 year at LaBRI (Computer Science) Université Bordeaux 1. Awarded a Postgraduate Overseas Research Experience Award by The University of Melbourne to facilitate this.

Research Activities

○ Research Grants

- 2002, Australian Research Council Discovery Project DP0209590 “Key combinatorial problems in lattice statistical mechanics”

Professional Activities

○ **Professional Associations**

- Member of the Australian Mathematical Society

○ **Conference Committees**

- Organising committee member of Formal Power Series and Algebraic Combinatorics (FPSAC) 2006 (San Diego)
- Program committee member of FPSAC 2006 (San Diego)
- Organising committee member of Counting Complexity 2005 (Dunk Island)
- Program committee member of FPSAC 2002 (Melbourne)

○ **Refereeing**

- Journal of Physics A: Mathematical and General
- Journal of Physics: Conference Series
- Journal of Statistical Mechanics: Theory and Experiment
- Theoretical Computer Science
- Submissions to the FPSAC conference.

Teaching Experience

- **Postgraduate Supervision — The University of Melbourne**
 - Yao-ban Chan — Awarded his PhD November 2005.
 - John Dethridge — PhD student, expected completion date June 2006.

- **Undergraduate Lecture Courses — The University of Melbourne**
 - 2005 — First year “Applied mathematics”
Integration, differential equations and Taylor series
Approximately 180 students.
 - 2004 & 2005 — First year “Introduction to biomedical mathematics”
Linear programming and differential equations
Approximately 160 students
 - 2003 — Third year “Dynamical systems and chaos”
Period doubling, chaos, symbolic dynamics and fractals
Approximately 70 students

- **Undergraduate Lecture Course — York University**
 - 2002 — Fourth year “Combinatorial mathematics”
Enumerative combinatorics and generating functions
Approximately 10 students

- **Undergraduate Tutorials — The University of Melbourne**
 - 2002 — Third year “Graph Theory”.
 - 1996—2000 A range of first year undergraduate courses covering linear algebra, calculus and discrete mathematics.

- **Summer Projects — The University of Melbourne**
 - Supervised three undergraduate students in 2004 and 2005.
 - Will supervise another undergraduate student in 2006.

- **Teaching References**
 - Available upon request.

Research Interests

- Enumerative combinatorics
- Simulation of combinatorial objects
- Lattice statistical mechanics

Publications

◦ Articles in refereed journals

All articles are available in PDF format from:

<http://www.ms.unimelb.edu.au/~andrewr>

1. A. L. Owczarek and A. Rechnitzer
On the number of anisospiral walks: a challenge in numerical analysis
Accepted for publication in Journal of Physics: Conference Series.
2. E. J. Janse van Rensburg, E. Orlandini, A.L. Owczarek, A. Rechnitzer and S.G. Whittington
Self-avoiding walks in a slab with attractive walls.
Accepted for publication in J. Phys. A: Math. Gen.
3. A. Rechnitzer
Haruspicy 3: The anisotropic generating function of directed bond-animals is not D-finite.
Accepted for publication in J. Combinatorial Theory — Series A.
4. A. Rechnitzer
Haruspicy 2: The anisotropic generating function of self-avoiding polygons is not D-finite.
Accepted for publication in J. Combinatorial Theory — Series A.
5. J. Krawczyk, T. Prellberg, A. L. Owczarek, and A. Rechnitzer
Pulling adsorbing and collapsing polymers from a surface.
J. Stat. Mech.: Theor. Exp. P05008 (2005)
6. J. Krawczyk, T. Prellberg, A. L. Owczarek, and A. Rechnitzer
Layering transitions for adsorbing polymers in poor solvents.
Europhys. Lett., 70: 726–732 (2005).
7. M.H. Albert, M. Elder, A. Rechnitzer, P. Westcott and M. Zabrocki,
On the Wilf-Stanley limit of 4231-avoiding permutations and a conjecture of Arratia.
Accepted for publication in Adv. Appl. Math.
8. R. Brak, A.L. Owczarek, A. Rechnitzer and S.G. Whittington
A directed walk model of a long chain polymer in a slit with attractive walls.
J. Phys. A: Math. Gen., 38: 4309-4325, 2005.

9. A.J. Guttmann, R. Parviainen and A. Rechnitzer,
Self-avoiding walks and trails on the 3.12^2 lattice.
J. Phys. A: Math. Gen., 38: 543–554, 2005.
10. G. Iliev, A. Rechnitzer and S. G. Whittington,
Localization of random copolymers and the Morita approximation.
J. Phys. A: Math. Gen., 38: 1209–1223, 2005.
11. J. Krawczyk, T. Prellberg, A. Rechnitzer and A.L. Owczarek,
Stretching of a chain polymer adsorbed at a surface.
J. Stat. Mech.: Theor. Exp.: P10004, 2004.
12. E.J. Janse van Rensburg and A. Rechnitzer,
Multiple Markov chain Monte Carlo study of adsorbing self-avoiding walks in two and three dimensions.
J. Phys. A: Math. Gen., 37: 6875–6898, 2004.
13. A. Rechnitzer and E.J. Janse van Rensburg,
Exchange relations, Dyck paths and copolymer adsorption.
Discrete Applied Mathematics, 150: 49–71, 2004.
14. E.J. Janse van Rensburg and A. Rechnitzer,
High precision canonical Monte Carlo determination of the growth constant of square lattice trees.
Phys. Rev. E, 67: 036116, 2003.
15. A. Rechnitzer,
Haruspicy and anisotropic generating functions.
Adv. Appl. Math., 30: 228–257, 2003.
16. M. Bousquet-Mélou and A. Rechnitzer,
The site-perimeter of bargraphs.
Adv. Appl. Math., 31: 86–112, 2003.
17. E. J. Janse van Rensburg and A. Rechnitzer,
Exchange symmetries in Motzkin paths and bargraph models of copolymer adsorption.
Electronic Journal of Combinatorics , 9: R20, 2002.
18. A. Rechnitzer and E. J. Janse van Rensburg,
Canonical Monte Carlo determination of the connective constant of self-avoiding walks.
J. Phys. A; Math. Gen., 35: L605–L612, 2002.
19. E. Orlandini, A. Rechnitzer, and S. G. Whittington,
Random copolymers and the Morita approximation: polymer adsorption and polymer localization.
J. Phys. A: Math. Gen., 35: 7729–7751, 2002.
20. M. Bousquet-Mélou and A. Rechnitzer,
Lattice animals and heaps of dimers.
Discrete Math., 258: 235–274, 2002.

21. E.J. Janse van Rensburg, A. Rechnitzer, M.S. Causo, and S.G. Whittington,
Self-averaging sequences in the statistical mechanics of random copolymers.
J. Phys. A: Math. Gen., 34: 6381–6388, 2001.
22. E. J. Janse van Rensburg and A. Rechnitzer,
Adsorbing and collapsing directed animals.
Journal of Statistical Physics, 105:49–91, 2001.
23. A.L. Owczarek, A. Rechnitzer, and L. H. Wong,
Addendum to “On three-dimensional self-avoiding walk symmetry classes”.
J. Phys. A: Math. Gen., 34: 6055–6060, 2001.
24. C. Chauve, S. Dulucq, and A. Rechnitzer,
Enumerating alternating trees.
J. Combinatorial Theory — Series A, 94:142–151, 2001.
25. A.L. Owczarek and A. Rechnitzer,
On three-dimensional self-avoiding walk symmetry classes.
J. Phys. A: Math. Gen., 33: 2685–2723, 2000.
26. M. Bousquet-Mélou, A. J. Guttmann, W. P. Orrick, and A. Rechnitzer.
Inversion relations, reciprocity and polyominoes.
Annal Comb., 3:223-249, 1999.
27. A. L. Owczarek, A. Rechnitzer, R. Brak and A. J. Guttmann.
On the hulls of directed percolation clusters.
J. Phys. A: Math. Gen., 30:6679-6691, 1997.

○ **Articles in refereed conference proceedings**

- S. Corteel, R. Brak, A. Rechnitzer and J. Essam
A combinatorial derivation of the PASEP algebra
Published in the Proceedings of FPSAC 2005.
- T. Prellberg, J. Krawczyk and A. Rechnitzer
Polymer simulations with a flat histogram stochastic growth algorithm
Published in the proceedings of the 17th Annual Workshop on Recent Developments in Computer Simulation Studies in Condensed Matter Physics. 2005.
- E. J. Janse van Rensburg and A. Rechnitzer
Exchange relations, Dyck paths and copolymer adsorption
Published in the Proceedings of FPSAC 2002.
- A. Rechnitzer.
Haruspicy and non-D-finite functions
Published in the Proceedings of FPSAC 2001.
- M. Bousquet-Mélou and A. Rechnitzer
Connected heaps are nice animals
Published in the Proceedings of FPSAC 1999.

○ Preprints and articles in preparation

Submitted articles are available in PDF format from:

<http://www.ms.unimelb.edu.au/~andrewr>

- R. Brak, J. Essam, J. Osborn, A. L. Owczarek and A. Rechnitzer
Lattice paths and the constant term
Submitted for publication in Journal of Physics: Conference Series.
- A. Rechnitzer, M. Elder, M. Zabrocki, J. Krawczyk, T. Prellberg and A. L. Owczarek
Approximate enumeration of pattern-avoiding permutations
In preparation
- E. J. Janse van Rensburg, T. Prellberg, and A. Rechnitzer
On partially directed walks in wedges
In preparation.
- J. Krawczyk, A. L. Owczarek, T. Prellberg, and A. Rechnitzer
Simulation of Lattice Polymers with Hydrogen-Like Bonding
In preparation.
- R. Brak, A. L. Owczarek, T. Prellberg, A. Rechnitzer, and S. G. Whittington
Finite-size scaling functions for directed polymers confined between sticky walls
In preparation
- J. Krawczyk, T. Prellberg, A. L. Owczarek, and A. Rechnitzer
On random walks with multiple site weightings and restrictions
In preparation