

CAREER

Education:

- 1995 PhD (Mathematics) University of Wisconsin-Madison
- 1989 BSc (Hons) (1st class, Mathematics) University of Canterbury

Positions:

- 2002-present University of Auckland (Comp Sci), Senior Lecturer above bar (= tenured Assoc Prof in US)
- 2001-2002 University of Auckland (Comp Sci), Lecturer (= Assistant Professor in US)
- 1999-2001 University of Montana (Math), Assistant Professor (tenure track)
- 1998-1999 Northern Illinois University (Math), Visiting Assistant Professor
- 1996-1998 University of Auckland (Math), NZST Postdoctoral Fellow

Distinctions / awards:

- NZST Postdoctoral Research Fellowship 1996-1998.

RESEARCH

Summary: Discrete mathematics, algorithms and data-rich applications. Asymptotic combinatorics. Computational social choice theory. Design and analysis of electoral systems. Network science. Currently 41 refereed journal/conference publications and 1 research monograph, 5 papers under review. Google Scholar profile: scholar.google.com/citations?user=yVByLBsAAAAJ. Publication list at end of this document. Personal archive of all publications: <https://www.cs.auckland.ac.nz/~mcw/Research/Outputs/papers.html>.

Competitive research grants

2015 University of Auckland FRDF NZ\$158000 (Associate Investigator, PI is Nirmal Nair)
2014 New Zealand Marsden Fund (joint application with Prof A. Slinko), NZ\$535000
2013 University of Auckland Seelye Foundation, NZ\$8000 for visit of Matthew Jackson (Stanford)
2011 RSNZ IMF grant to visit USA, NZ\$3300
2010 University of Auckland Cross-Faculty Fund, NZ\$18250 for CMSS workshop
2007 University of Auckland FRDF, NZ\$10000
2006 NZIMA grant (with C. Semple and M. Atkinson) for thematic programme in Algorithms, NZ\$380000
2004 University of Auckland VCUDF, NZ\$137500 for postdoctoral fellow
2002 University of Auckland New Staff Grant, NZ\$14000
2001 University of Montana Research/Creativity grant, US\$4000
(total around NZ\$1.3 million)

Invited funded presentations

- Program Algorithmic and Enumerative Combinatorics, Erwin Schroedinger Institute (Vienna), 2017-11
- Program **Lattice walks at the Interface of Algebra, Analysis and Combinatorics**, Banff International Research Station 2017-09
- 38ACCMCC, annual meeting of the Combinatorial Mathematics Society of Australasia, Wellington 2014-12 (invited, all expenses paid)
- AEC Summer School, Hagenberg, Austria 2014-08 (5 lectures, invited, all expenses paid)
- Workshop on Asymptotic Enumeration, Australian National University, 2007 (3 lectures, invited, all expenses paid).

Research visits (formally hosted for at least one week)

- IMBS, University of California Irvine, 2016-09-17 – 2016-10-14 (host: D. Saari)
- Visiting Professor, Department of EECS, University of California-Berkeley, 2013-03-24 – 2013-05-23 (host: E. Mossel)
- Department of Mathematics, University of Pennsylvania, 2009-11 (host: R. Pemantle)
- Projet Algo, INRIA Rocquencourt, 2004-06 (host: P. Flajolet)

TEACHING

Research supervision/assessment (University of Auckland unless specified)

- Mentor for postdoctoral fellow Alexander Raichev, 2006-2009 (works as transport consultant in Auckland).
- Principal supervisor for PhD student Reyhaneh Reyhani, 2008-2012 (works as data scientist in San Diego).
- Principal supervisor for PhD students Samin Aref 2015-, Neda Sakhaee 2015-, Hooman Alavizadeh 2015-16 (transferred to Massey University to obtain a scholarship).
- Cosupervisor for PhD student Jonathan Klawitter, 2016-.
- Advisor for PhD student Masoud Khosravani 2008-2011, Shaun White 2012-2016.
- Supervisor for BSc (Hons) projects: Egor Ianovski, 2011, Miranda Emery, 2012-13.
- Supervisor for BE (Hons) projects: Ivan Pavlov 2017, Kandarp Dalal 2017.
- External examiner for PhD thesis: Davide Baccherini, Università di Firenze, 2008.
- External examiner for MSc thesis: Chris Monteith, University of Otago 2006, Vishal Goundar, University of the South Pacific, 2001.
- Examiner for MSc thesis: Matthew Elliott, 2015.
- Several research projects by undergraduate students, some resulting in refereed publications.

Classroom teaching

- Extensive experience lecturing mathematics and computer science in 5 universities in NZ and USA since 1995. All levels from first year to postgraduate.
- Topics taught: linear algebra, Lie algebras, abstract algebra, calculus, algorithm design and analysis, formal languages, generating functions, discrete mathematics for CS/SE, computational social choice.
- Since 2002, taught parts of over 50 lecture course offerings at University of Auckland.
- List of courses, student evaluation summaries, and peer review of teaching are **available on request**.

Teaching development

- University of Auckland Teaching improvement grant 2010 and 2008, NZ\$14000 total (with M. J. Dinneen and A. Luxton-Reilly) for automated system for assessing programming assignments. Supervised implementation with M.J. Dinneen (www.cs.auckland.ac.nz/automated-marker).
- Author (with M. J. Dinneen and G. Gimel'farb) of textbook "Introduction to Algorithms, Data Structures, and Formal Languages" (ISBN 9781442512061 Pearson NZ, 2nd edition 2009, 3rd e-book edition 2013).

SERVICE

Memberships

- Founding member of University of Auckland Centre for Mathematical Social Sciences, 2010. Director, 2011 and 2014. See cmss.auckland.ac.nz.
- Associate Investigator, Te Punaha Matatini (National Centre of Excellence in Complex Systems).
- Member of NZ and American Mathematical Societies.

Service to profession

- **Academic Editor**, *PeerJ Computer Science* 2015-
- **Managing editor**, *Online Journal of Analytic Combinatorics* 2012-15.
- **Editor**, *NZ Mathematical Society Newsletter* Aug 2013-Dec 2015. Local correspondent 2009-13.
- **Referee** for journals (listed alphabetically): *Advances in Applied Mathematics*, *Algorithmica*, *Annales*

d'Economie et de Statistique, Contemporary Mathematics, Discrete Applied Mathematics, Discrete Mathematics and Theoretical Computer Science, Electronic Journal of Combinatorics, International Journal of Foundations of Computer Science, Journal of Combinatorial Theory A, Journal of Algebra, Journal of Complex Networks, Journal of Statistical Physics, Linear Algebra and its Applications, Mathematical Social Sciences, New Zealand Journal of Mathematics, Random Structures and Algorithms, SIAM Journal on Discrete Mathematics, Social Choice and Welfare, Theoretical Computer Science.

- **CS conference programme committees** (refereeing): *CATS 2012, AAMAS 2012, IJCAI 2011, LAGOS 2013, ANALCO 2014, EXPLORE 2014, AAMAS 2015, AAAI 2015, EXPLORE 2015, ADT 2015, EXPLORE 2016, EXPLORE 2017.*
- **Discussant:** Political science workshop organized by B. Grofman, Laguna Beach, 2016-01.
- **Reviewer** for Mathematical Reviews since 1999 (37 reviews to date).
- **Head of organizing committee** for *4th International Conference on Combinatorial Mathematics and Combinatorial Computing*, 2008 (<https://www.cs.auckland.ac.nz/research/groups/theory/4ICC/>)
- **Referee for grant application:** Israel Science Foundation, 2015; Hong Kong Research Grants Council 2017.
- Active in **Open Access** movement (drafter and signatory of [Tasman Declaration on Open Research](#)). Signatory of [Elsevier boycott](#) in 2012. Using Freedom of Information laws to publicize journal costs. Founder of international journal reform action group. Ran [international survey](#) of attitudes to journal reform. Drafter of [Fair Open Access Principles](#). Founding member and board member of [MathOA Foundation](#) (Netherlands).

Service to community

- Submission to Electoral Commission of NZ on MMP Review, 2012.
- Produced [online simulator](#) to inform public of consequences of referendum on electoral reform in New Zealand, 2011.

Contribution to local research environment

- Obtained funding for and hosted the research visits of: Bernard Grofman (University of California Irvine) 2016-02; Matthew Jackson (Stanford University), 2014-12; Tim Roughgarden (Stanford University), 2013-12.

Service to department, faculty and university is available on request.

OTHER INFORMATION

Language skills

- English (native), Farsi (Persian), French, Esperanto.
- C++, Java, Python, Sage, R.

Personal information

- NZ citizen, born in Ashburton, NZ.
- Married to Golbon Zakeri since 1991. Two children.
- Former NZ junior chess champion and University Challenge (1988) winning team member.

ACADEMIC REFEREES

Professor Robin Pemantle
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(teaching/service)

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PUBLICATIONS AND SEMINAR/CONFERENCE PRESENTATIONS

Books:

1. PEMANTLE, R., WILSON, M. C. *Analytic Combinatorics in Several Variables* (research monograph), Cambridge University Press, 2013, 380pp.

Refereed Journal Articles Appeared:

- 2) WILSON, M.C. 'Diagonal asymptotics for products of combinatorial classes'. *Combinatorics, Probability, and Computing*, 24(1) (Philippe Flajolet memorial issue), 354-372, 2015.
- 3) MANSOUR, T; SHATTUCK, M; WILSON, M.C. 'Congruence successions in compositions', *Discrete Mathematics and Theoretical Computer Science* 16, 327-338, 2014.
- 4) PRITCHARD, G., WILSON, M.C. 'Simulating the 2011 referendum in New Zealand'. *Parliamentary Affairs*, 67 (4), 969-980, 2014.
- 5) PRITCHARD, G., REYHANI, R., WILSON, M. C. 'Power measures derived from the sequential query process'. *Mathematical Social Sciences*, 65(3), 174-180, 2013.
- 6) LLADSER, M.E., POTOČNIK, P., SIRAN, J., WILSON, M.C. 'Random Cayley digraphs of diameter 2 and given degree'. *Discrete Mathematics and Theoretical Computer Science* 14, 83-90, 2012.
- 7) RAICHEV, A., WILSON, M.C. 'Asymptotics of coefficients of multivariate generating functions. Improvements for multiple points.', *Online Journal of Analytic Combinatorics* 6, 2011 (25pp).
- 8) WILSON, M. C. 'An interesting new Mahonian permutation statistic', *Electronic Journal of Combinatorics* 17, R147, 2010.
- 9) PRITCHARD, G., WILSON, M.C., 'Asymptotics of the minimum manipulating coalition size for positional voting rules under IC behaviour', *Mathematical Social Sciences*, 58, p35-57, 2009.
- 10) WILSON, M.C. 'Random and Exhaustive Generation of Permutations and Cycles', *Annals of Combinatorics*, 12, p509-520, 2009.
- 11) PEMANTLE, R., WILSON, M.C. 'Twenty combinatorial examples of asymptotics derived from multivariate generating functions', *SIAM Review* 50, p199-272, 2008.
- 12) RAICHEV, A., WILSON, M.C. 'Asymptotics of Coefficients of Multivariate Generating Functions: Improvements for Smooth Points', *Electronic Journal of Combinatorics* 15, R90 (17pp), 2008.
- 13) WILSON, M.C., FIRRO, G., MANSOUR, T. 'Longest alternating subsequences in pattern-restricted permutations', *Electronic Journal of Combinatorics* 14, R34 (12pp), 2007.
- 14) PRITCHARD, G., WILSON, M.C. 'Exact results on manipulability of positional voting rules', *Social Choice and Welfare* 29, p487-513, 2007.
- 15) WILSON, M.C., PRITCHARD, G. 'Probability calculations under the IAC hypothesis', *Mathematical Social Sciences* 54, p244-256, 2007.
- 16) WILSON, M.C. 'Probability generating functions for Sattolo's algorithm', *Journal of the Iranian Statistical Society* 3 (invited special issue on analysis of algorithms), p297-308, 2004.
- 17) PEMANTLE, R., WILSON, M.C. 'Asymptotics of Multivariate Sequences II. Multiple points of the singular variety', *Combinatorics, Probability and Computing* 13, p735-761, 2004.
- 18) DINNEEN, M.J., PRITCHARD, G., WILSON, M.C. 'Degree- and time-constrained broadcast networks', *Networks* 39, p121-129, 2002.
- 19) PEMANTLE, R., WILSON, M.C. 'Asymptotics of Multivariate Sequences I: Smooth Points of the Singular Variety', *Journal of Combinatorial Theory Series A* 97, p129-161, 2002.
- 20) RILEY, D.M., WILSON, M.C. 'Associative rings satisfying the Engel condition', *Proceedings of the American Mathematical Society* 127, p973-976, 1999.
- 21) RILEY, D.M., WILSON, M.C. 'Associative algebras satisfying a semigroup identity', *Glasgow Mathematical Journal* 41, p453-462, 1999.
- 22) BERGEN, J., WILSON, M.C. 'X-inner automorphisms of semi-commutative quantum algebras', *Journal of Algebra* 220, p152-173, 1999.
- 23) DINNEEN, M.J., VENTURA, J.A., ZAKERI, G., WILSON, M.C. 'Compound constructions of broadcast networks' *Discrete Applied Mathematics*, 93, p205-232, 1999.
- 24) RILEY, D.M., WILSON, M.C. 'Group algebras and enveloping algebras with nonmatrix and semigroup identities' *Communications in Algebra*, 27, p3545-3556, 1999.
- 25) DINNEEN, M.J., VENTURA, J. A., WILSON, M.C., ZAKERI, G. 'Construction of time-relaxed minimal broadcast networks' *Parallel Processing Letters*, 9, p53-68, 1999.
- 26) WILSON, M.C., PRITCHARD, G. 'Primeness of the enveloping algebra of the special Lie superalgebras', *Archiv der Mathematik* 70, p187-196, 1998.
- 27) WILSON, M.C. 'Bell's primeness criterion and the simple Lie superalgebras', *Journal of Pure and Applied*

- Algebra* 133, p241-260, 1998.
- 28) WILSON, M.C., PRITCHARD, G., WOOD, D. 'Bell's primeness criterion for $W(2n+1)$ ', *Experimental Mathematics* 6, p77-86, 1997.
 - 29) WILSON, M.C. 'Primeness of the enveloping algebra of Hamiltonian superalgebras', *Bulletin of the Australian Mathematical Society* 56, p483-488, 1997.
 - 30) WILSON, M.C. 'Crossed products of restricted enveloping algebras', *Communications in Algebra* 25, p487-496, 1997.
 - 31) WILSON, M.C. 'Primeness of the enveloping algebra of a Cartan type Lie superalgebra' *Proceedings of the American Mathematical Society* 124, p383-387, 1996.
 - 32) WILSON, M.C. 'Delta methods for enveloping algebras of Lie colour algebras', *Journal of Algebra* 175, p661-696, 1995.

Refereed Conference Proceedings Appeared/Accepted:

- 33) SAKHAEI, N., WILSON, M.C., ZAKERI, G. 'New Zealand legislation network'. *Proceedings of JURIX2016*. (4pp)
- 34) MELCZER, S., WILSON, M.C. 'Asymptotics of lattice walks via analytic combinatorics in several variables'. *Proceedings of FPSAC2016*. (12pp)
- 35) EMERY, M., WILSON, M.C. 'Iterated regret minimization in voting games'. *Proceedings of COMSOC 2014*. (12pp)
- 36) REYHANI, R., WILSON, M.C., KHAZAEI, J. 'Coordination via Polling in Plurality Voting Games under Inertia'. *Proceedings of COMSOC 2012*.
- 37) REYHANI, R., WILSON, M.C., 'Best-reply dynamics for scoring rules'. *Proceedings of ECAI 2012*.
- 38) IANOVSKI, R., YU, L., ELKIND, E., WILSON, M.C. 'The complexity of safe manipulation under scoring rules'. *Proceedings of IJCAI 2011*.
- 39) PEMANTLE, R., WILSON, M.C.. 'Asymptotic expansions of oscillatory integrals with complex phase', in *Algorithmic Probability and Applications (AMS Contemporary Mathematics 520)*, 2010.
- 40) WILSON, M.C., REYHANI, R. 'The probability of safe manipulation', *Proceedings of COMSOC 2010*.
- 41) WILSON, M.C., RAICHEV, A. 'A new method for computing asymptotics of diagonal coefficients of multivariate generating functions', *Proceedings of AofA 2007, DMTCS Proceedings*, p.439-450.
- 42) WILSON, M.C. 'Asymptotics for generalized Riordan arrays', *Proceedings of AofA 2005, DMTCS Proceedings* p.323-334, 2005.

Journal – Commentary/Letter

- 43) WILSON, M.C. 'Structure of enveloping algebras and Hopf algebras', *New Zealand Science Review*, 65, (1), p11-11, 2008, <http://www.scientists.org.nz/journal>.

Journal – Book Review

- 44) WILSON, M.C. 'Review of Models of Conflict and Cooperation by David Gillman and Rick Housman', Review in *SIGACT News*, 44(1), p34-35, 2013.
- 45) WILSON, M.C. 'The Mathematics of Voting and Elections: A Hands-on Approach by J.Hodge and R. Klima (Review)', Review in *ACM SIGACT News*, 41(3), p34-36, 2010.

Report – Technical (not otherwise published)

- 46) WILSON, M.C; RAICHEV, A. 'A new approach to asymptotics of Maclaurin coefficients of algebraic functions', 6pp, 2008.

Substantial works submitted/in preparation

- 47) AREF, S., MASON, A.J., WILSON, M.C. 'An exact method for computing the frustration index in signed networks using binary programming'. Preprint 2016-11-29 arxiv.org/abs/1611.09030 (30pp).
- 48) IANOVSKI, E., WILSON, M.C. 'Manipulation of consular election rules. Preprint, 22pp. Under review Social Choice and Welfare, 2016.
- 49) AREF, S., WILSON, M.C. 'Measures of partial balance in signed networks'. Under review Network Science, 2016 (20pp).

- 50) HADJIBEYLI, B., WILSON, M.C. 'Distance rationalization of anonymous and homogenous voting rules'. Preprint, 16pp. Under review Social Choice and Welfare, 2016.
- 51) HADJIBEYLI, B., WILSON, M.C. 'Distance rationalization of voting rules'. Preprint, 20pp. Under review Social Choice and Welfare, 2016.
- 52) GIRARD, P., PAVLOV, V., WILSON, M.C. 'Networked crowds answer tricky questions poorly'. Under review 2017.
- 53) LO, J., WILSON, M.C. 'Average-case analysis of random assignment algorithms'. Preprint, 2016 (15pp).
- 54) LO, J., WILSON, M.C. 'New matching algorithms.' Preprint (19p), 2017.
- 55) MELCZER, S., WILSON, M.C. 'Asymptotics of symmetric lattice walks in the positive orthant'. Preprint, 2015.
- 56) PRITCHARD, G., WILSON, M.C. 'Multi-district preference modelling'. Preprint (10pp), 2017.
- 57) PRITCHARD, G., WILSON, M.C. 'The electoral sweet spot revisited'. Preprint, 2017.
- 58) GROFMAN, B., WILSON, M.C. 'Swing models'. Preprint, 2017.
- 59) MERLINI, D., SPRUGNOLI, R., WILSON, M.C. 'The Riordan domain'. Preprint, 33pp.

Software

- 60) PRITCHARD, G; WILSON, M.C. '2011 Referendum Options Simulator', 2011. (www.stat.auckland.ac.nz/~geoff/voting).

Professional/Outreach

- 61) NEYLON, C., ROBERTS, D.M., WILSON, M.C. 'Results of a worldwide survey of mathematicians on journal reform'. European Mathematical Society Newsletter 103, p46-49, 2017.
- 62) WILSON, M.C. (ed.) New Zealand Mathematical Society Newsletter, issues 118-124, August 2013 – August 2015. ISSN 0110-0025. (<http://nzmathsoc.org.nz/?newsletter>)
- 63) WILSON, M.C. *Cybermath* column in NZ Mathematical Society Newsletter, August 2013 – present (3 issues per year)
- 64) WILSON, M.C. 'Market failure in the research world'. 2014-11. Contributed guest post: <http://publicaddress.net/system/cafespeaker-market-failure-in-the-research-world>
- 65) WILSON, M.C. 'The Elsevier boycott and beyond', 2012. Contributed Editorial, NZ Mathematical Society Newsletter.
- 66) WILSON, M.C; FOWLIE, M. 'Submission to Electoral Commission of New Zealand Review of MMP', 2012.
- 67) WILSON, M.C. 'International Rankings (opinion piece)', 2010. University of Auckland News.

Consulting

Verification of electronic voting machine, Deloitte, 2011.
 Design of election method for board of agricultural producer organization, 2014.
 Voting method for national sports awards, 2016.

Recent conference presentations

- CMSS Workshop, Auckland 2017-02 (contributed)
- ORSNZ 2016, Auckland, 2016-11 (contributed)
- COMSOC 2016, Toulouse, France, 2016-06 (contributed)
- INFORMS International, Kona, Hawaii, 2016-06 (invited)
- CMSS Summer Workshop, Auckland, 2016-02 (contributed).
- CANADAM 2015, Saskatoon, Canada 2015-06 (invited)
- COMSOC 2014, Pittsburgh, USA 2014-06 (contributed)
- NZ Mathematics Colloquium, Tauranga, 2013-12 (contributed)
- AofA 2013, Menorca, Spain 2013-05 (invited)
- COMSOC 2012, Krakow, Poland, 2012-09 (contributed, refereed)
- COMSOC 2010, Duesseldorf, Germany, 2010-09 (contributed, refereed).
- 1st CMSS Summer workshop, Auckland, 2010-02 (contributed).

Recent seminar talks

- Distance-based aggregation rules. *IMBS seminar, University of California Irvine*, 2016-10-07.
- Average-case analysis of random assignment algorithms. *CMSS seminar, University of Auckland*, 2016-05-02.
- Lattice path asymptotics via ACSV. *UCLA Combinatorics seminar*, 2016-01-07.
- Predicting FPP elections. *CMSS seminar, University of Auckland*, 2015-10-06.
- Where are the best parliamentary election methods? *Center for Study of Democracy Seminar, University of California Irvine*, 2015-02-23.
- Belief diffusion in social networks. *CMSS Summer workshop, University of Auckland*, 2014-12-09.
- Experimental study of influence in social networks. *CMSS seminar, University of Auckland*, 2014-05-20.
- Asymptotics of multivariate generating functions *University of Auckland Mathematics Colloquium*, 2014-03-06.
- Welfare Implications of Strategic Voting. *CMSS Summer Workshop, University of Auckland*, 2013-12-11.
- Some probabilistic questions in social choice. *University of California Berkeley Probability Seminar*, 2013-04-03.
- Electoral engineering via simulation. *University of California Davis Political Science Department seminar*, 2013-05-22; *University of California Irvine IMBS Seminar*, 2013-04-26.
- Power, decisiveness, values. *CMSS seminar, University of Auckland*, 2011-05-10.
- What is computational social choice? *Department of Computer Science seminar, University of Auckland*, 2010-10-18.
- The probability of safe manipulation. *CMSS seminar, University of Auckland*, 2010-08-25.
- Measuring the manipulability of voting rules. *University of Rochester Theory CANAL seminar*, 2009-11-16; *Union College Mathematics Department*, 2009-11-18.
- Higher order asymptotics from multivariate generating functions. *University of Pennsylvania Combinatorics and Probability Seminar*, 2009-11-10; *Rutgers Experimental Mathematics Seminar*, 2009-11-19; *University of California-Berkeley Discrete Mathematics Seminar*, 2009-12-02; *University of California-Davis Discrete Mathematics Seminar*, 2009-12-03.