

# CURRICULUM VITAE

**NAME** Rodney Graham DOWNEY

**Current Position** Professor of Mathematics

**ADDRESS** School of Mathematics, Statistics & Operations Research  
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**DATE OF BIRTH** 20 September, 1957

**MARITAL STATUS** Married, two children

**NATIONALITY** New Zealand and Australian

## **BACKGROUND:**

### **Academic:**

**1975-1978** Undergraduate at University of Queensland, St. Lucia, Queensland, Australia  
B.Sc. with first class honours in Mathematics

**1979-1982** Postgraduate at Monash University, Clayton, Victoria, Australia, Ph.D. in  
mathematics (November 1982)

### **Professional:**

**1982** Lecturer in mathematics at Chisholm Institute of Technology (now Monash University), Caulfield campus, Caulfield East Victoria Australia

**1983** (Spring) Visiting Assistant Professor at Western Illinois University, Macomb, Illinois, U.S.A.

**1983-1985** Lecturer at National University of Singapore Kent Ridge, Republic of Singapore

**1985-1986** Visiting Assistant Professor at University of Illinois at Urbana-Champaign, Urbana, Illinois, U.S.A.

**1986-1987** Lecturer in Mathematics, Victoria University of Wellington, Wellington, New Zealand

- 1988-1990** Senior Lecturer in Mathematics, Victoria University of Wellington, Wellington, New Zealand
- 1989** Member, Mathematical Sciences Research Institute, Berkeley, California, USA
- 1991-95** Reader in Mathematics, Victoria University of Wellington, Wellington, New Zealand
- 1992** Visiting Scholar, Mathematics Department, Cornell University, Ithaca, New York, USA
- 1992** Member, Mathematical Sciences Institute, Cornell University, Ithaca, New York, USA
- 1993** Lee Kong Chang Visiting Fellow, National University of Singapore.
- 1995** Visiting Professor, Mathematics Department, Cornell University.
- 1997** Visiting Scholar, University of Siena.
- 1999** Visiting Scholar, University of Wisconsin, Madison.
- 1999** Visiting Professor, National University of Singapore.
- 2000** Visiting Professor, University of Notre Dame, Indiana.
- 2001** Visiting Scholar, University of Chicago.
- 2003** Visiting Scholar, University of Chicago.
- 2005** Visiting Professor, University of Chicago.
- 2008** Visiting Professor, University of Chicago.
- 2010** Visiting Scholar, University of Chicago.
- 2008** Visiting Scholar, University of Madison, Wisconsin.
- 2005, 2011** Member, Institute for Mathematical Sciences, Singapore.
- 2011** Visiting Professor, Nanyang University of Technology, Singapore.
- 2003** Inaugural MacLaurin Fellow, New Zealand Institute for Mathematics and its Applications (Center of Research Excellence).
- 2008-2010** James Cook Fellow, Royal Society of New Zealand.
- 2009-2012** Chair MIS Panel and Member of Council, Marsden Fund.
- 1995-** Personal Chair, Professor of Mathematics, Victoria University of Wellington, New Zealand.

## **Awards**

## **Prizes**

- 1990** New Zealand Royal Society Hamilton Award for Science
- 1991** Foundation Fellow of the Institute of Combinatorics and its Applications.
- 1992** New Zealand Mathematical Society Award for Research.
- 1994** New Zealand Association of Scientists Research Medal for the best New Zealand based scientist under 40.
- 2007** Elected Fellow of the New Zealand Mathematics Society.
- 2000** Vice-Chancellor's Award for Research Excellence.
- 1996** Elected Fellow of the Royal Society (NZ)
- 2006** Invited Speaker, International Congress of Mathematicians.
- 2007** Invited Speaker, International Congress of Logic, Methodology, and Philosophy of Science.
- 2008** Elected Fellow of the Association for Computing Machinery.
- 2008-2010** James Cook Fellowship, Royal Society of New Zealand.
- 2008** Victoria University of Wellington Award for Research Excellence.
- 2010** Shoenfield Prize from the Association for Symbolic Logic.
- 2012** Member, Newton Institute (Cambridge) for the Alan Turing Programme.

## **Grants**

- 1979-1982** Commonwealth Postgraduate Research Award (Australia)
- 1983-1985** Research Grant (Singapore)
- 1986** Support Grant from U.S. National Science Foundation
- 1988-91, 92-95, 96-99** PI for three US/NZ Binational Cooperative Grants
- 1989** Support Grant from Mathematical Sciences Research Institute, Berkeley, USA
- 1992** Support Grant from Mathematical Sciences Institute, Ithaca New York, USA
- 1993** Support Grant from the Lee Foundation, National University of Singapore.
- 1995-97** PI Research Grant from The Marsden Fund for Basic Science.
- 1998-2001** PI Research Grant from The Marsden Fund for Basic Science.
- 2002-2005** PI Research Grant from The Marsden Fund for Basic Science.
- 2005-** PI Research Grant from The Marsden Fund for Basic Science

- 2005-** AI on Catherine McCartin's Research Grant from The Marsden Fund for Basic Science.
- 1998-** AI on 2 Marsden Grants to support the *NZ Mathematical Sciences Research Institute*, of which I am one of the directors, along with Professors Marston Conder, David Gauld, Gaven Martin, and Vaughan Jones.
- 2002-** PI on the CoRE grant from the New Zealand Government for the *New Zealand Institute for Mathematics and its Applications*
- 1995** Personal Chair in Mathematics, Victoria University.
- 1997** Support grant from the Italian Government.
- 2003-** AI on NSFC Grand International Joint Project Grant No. 60310213 "New Directions in Theory and Applications of Models of Computation" (China)
- 2005-2008** AI on Noam Greenberg's Marsden Grant.
- 2008-2010** James Cook Fellowship, Royal Society of New Zealand.
- 2011** PI on NSF Grant 1135626 with Charles Steinhorn for Travel Grants for 12 US based researchers to speak at the 12th Asian Logic Conference in Wellington, December, 2011. (\$US 31K)

### **Postdoctoral Fellows Supervised.**

Current Position Listed.

- Michael Moses (George Washington University)
- Peter Cholak (University of Notre Dame)
- Geoff LaForte (Western Florida University)
- Richard Coles (Telecom, UK)
- Reed Solomon (University of Connecticut).
- Walker White (Cornell University)
- Denis Hirschfeldt (University of Chicago).
- Evan Griffiths (Genworth Financial, Helsinki)
- Wu Guohua (Nanyang Technological University, Singapore)
- Joe Miller (University of Wisconsin, Madison)
- Yu Liang (Nanjing University, China)
- Rebecca Weber (Dartmouth)

- Noam Greenberg (Victoria University)
- Antonio Montalbán (University of Chicago)
- George Barmpalias (Institute for Logic, Language and Computation Universiteit van Amsterdam)
- Laurent Bienvenu (University of Paris 7)
- Asher Kach (University of Connecticut)
- Dan Turetsky (current, jointly with Greenberg)

### **Ph. D. Students supervised**

Wu Guohua (1999-2002) (Nanyang University of Technology)

Catherine McCartin (1999-2003) (Massey University)

Ng Keng Meng (Selwyn) (2006-2009) (Nanyang University of Technology)

Adam Day (2008-2011) (Miller Institute, Berkeley)

Both Wu and McCartin won the *Hatherton Award* for the best paper arising from a PhD paper by a New Zealand based PhD.

### **M. Sc. Student supervised**

Stephanie Reid (2003), John Fouhy (2003)

### **Professional Service:**

- Managing Editor *Bulletin of Symbolic Logic*, 2004-2010. (full term)
- Editor *Journal of Symbolic Logic*, 1999-2004, Coordinating editor 2000-2004. (full term)
- Editor, *Theory of Computing Systems* (formerly *Math. Systems Theory*), 2006-
- Editor, *Archive for Mathematical Logic*, 2009-
- Editor, *Computability*, 2011-
- Co-director, New Zealand Mathematical Sciences Research Institute.
- Co-director, New Zealand Institute for Mathematics and its Applications.
- Vice-President, New Zealand mathematics Society 2000-2001.
- President, New Zealand Mathematical Society 2001-2003, immediate past president, 2004.

- Prizes committee, council, and Australasian committee Association for Symbolic Logic 2000-.
- Nominating committee and committee on plagiarism Association for Symbolic Logic.
- Fellows' Committee Royal Society New Zealand 1999-2001. Hamilton Prize Committee, 2004.
- Marsden panel for Mathematical and Information Sciences 1997, 2002,2003 (chair 2009-).
- Marsden Council 2009-
- Royal Society Travel Grants Committee 2008-2010
- New Zealand Mathematical Sciences Advisory Group 1999-2003.
- New Zealand representative on the International Mathematics Union 2001-2004.
- Fellows Selection Panel, Royal Society, 2005.
- Chair of the Steering Committee for *Computability, Complexity and Randomness* series.
- Steering Committee for *International Workshop of Parameterized Complexity and Exact Computation*, 2005-2009.

**Hobbies:** Surfing, Tennis, Scottish Country Dancing.

**AREAS OF INTEREST:** Algebra, Logic, Complexity theory

## **PUBLICATIONS:**

### **Thesis:**

*Abstract Dependence, Recursion Theory and the Lattice of Recursively Enumerable Filters* Thesis, Monash University, Clayton, Victoria, Australia, (1982). J.N. Crossley, Supervisor.

## **Publications**

### **Books**

1. *Parameterized Complexity*, (with M. Fellows) Springer-Verlag, Monographs in Computer Science, 1999 xiii+533 pages.
2. *Algorithmic Randomness and Complexity* (with D. Hirschfeldt), Springer-Verlag , Computability in Europe Series No 1, December 2010. xxvi+855 pages.

## **Books Edited**

1. *Aspects of Complexity*, (with D. Hirschfeldt, editors), de Gruyter Series in Logic and Its Applications, Volume 4, 2001, vi+172 pages.
2. *Proceedings of the 7th and 8th Asian Logic Conferences*, (Chief Editor, with Ding Decheng, Tung Shi Ping, Qiu Yu Hui, Mariko Yasugi, and Wu Guohua, editors) World Scientific, 2003, viii+471 pages.
3. *Parameterized and Exact Computation: First International Workshop, IWPEC 2004, Bergen, Norway, September 14-17, 2004. Proceedings* (Rod Downey, Frank Dehne, Michael Fellows, editors) Springer-Verlag Lecture Notes in Computer Science, Vol 3162, Springer Verlag, 2004. 300 pages.
4. *Mathematical Logic in Asia: Proceedings of the 9th Asian Logic Conference*, (Rod Downey, Sergei S. Goncharov and Hiroakira Ono, eds) World Scientific, 2006, Singapore, viii+319 pages.
5. *Proceedings Fifteenth Computing: The Australasian Theory Symposium (CATS 2009)*, Wellington, New Zealand. CRPIT, 94. (Downey, R. and Manyem, P., Eds.) ACS.
6. *Proceedings of the 10th Asian Logic Conference*: (with Joerg Brendle, Chong Chi Tat, Hirotaka Kikyo, Hiroakira Ono and Feng Qi), World Scientific, 2009.

### Journal Special Issues Edited

1. Special Issue of the *Annals of Pure and Applied Logic* Volume 138, Issues 1-3, Pages 1-222 (March 2006), devoted to the NZIMA Logic Programme (with Rob Goldblatt).
2. Special Issue of *Theoretical Computer Science*, devoted to *Parameterized Complexity and Exact Computation*, (with Mike Langston, and Rolf Niedermeier) Volume 351, Issue 3, Pages 295-460 (28 February 2006) *Parameterized and Exact Computation*
3. Special Issue of *Theory of Computing Systems* *Exact Computation and Parameterized Complexity*. Vol 41 No 3 (October 2007).
4. Two special issue of *The Computer Journal* devoted to *Parameterized Complexity* (with Mike Fellows and Mike Langston). Volume 58 Numbers 1 and 3, 2008, Oxford University Press.

### Electronic Article

1. *Algorithmic randomness*, (with Jan Reimann) for *Scholarpedia*, (Rodney G. Downey and Jan Reimann (2007) *Algorithmic randomness*. *Scholarpedia*, 2(10):2574  
[http://www.scholarpedia.org/article/Algorithmic\\_Randomness](http://www.scholarpedia.org/article/Algorithmic_Randomness)

### Papers

1. On a question of A. Retzlaff, *Z. Math. Logik Grund. der Math.*, **29** (1983) 379-384.

2. Abstract dependence, recursion theory and the lattice of recursively enumerable filters, *Bull. Aust. Math. Soc.*, **27** (1983) 461-464.
3. Nowhere simplicity in matroids, *J. Aust. Math. Soc. (Series A)* **35** (1983) 28-45.
4. Co-immune subspaces and complementation in  $V_\infty$ , *J. Symbolic Logic*, **49** (1984) 528-538.
5. Perfect McLain groups are super-perfect, (with A.J. Berrick), *Bull. Aust. Math. Soc.*, **29** (1984) 249-257.
6. Bases of supermaximal subspaces and Steinitz systems, *J. Symbolic Logic*, **49** (1984) 1146-1159.
7. Decidable subspaces and recursively enumerable subspaces, (with C.J. Ash), *J. Symbolic Logic*, **49** (1984) 1137-1145.
8. Some remarks on a theorem of Iraj Kalantari concerning convexity and recursion theory, *Z. Math. Logik Grund. der Math*, **30** (1984) 295-302.
9. The universal complementation property, (with J.B. Remmel), *J. Symbolic Logic*, **49** (1984) 1125-1136.
10. A note on decomposition of recursively enumerable subspaces, *Z. Math. Logik Grund. der Math.*, **30** (1984) 456-470.
11. Automorphisms of supermaximal subspaces, (with G.R. Hird), *J. Symbolic Logic*, **50** (1985) 1-9.
12. Effective extensions of linear forms in a recursive vector space over a recursive field, (with I.Kalantari), *Z. Math. Logik Grund. der Math.*, **31** (1985) 193-200.
13. The degrees of r.e. sets without the universal splitting property, *Trans. Amer. Math. Soc.*, **291** (1985) 337-351
14. Sound, totally sound, and unsound recursive equivalence types, *Annals Pure and App. Logic*, **31** (1986) 1-22.
15. Splitting properties of r.e. sets and degrees (with L.V. Welch), *J. Symbolic Logic*, **51** (1986) 88-109.
16. Recursion theory and ordered groups, (with S. Kurtz) *Annals Pure and App. Logic.*, **32** (1986) 137-151.
17. Undecidability of  $L(F_\infty)$  and other lattices of r.e. substructures, *Annals Pure and App. Logic*, **32** (1986) 17-26. (Corrigendum in *ibid* 48 (1990) 299-301.)
18. Bases of supermaximal subspaces and Steinitz systems II, *Z. Math. Logik Grund. der Math*, **31** (1986) 203-210.
19. Structural interactions of the recursively enumerable T- and W-degrees, (with M. Stob), *Annals Pure and App. Logic.*, **31** (1986) 205-236.
20. Orbits of creative subspaces, *Proc. Amer. Math Soc.*, **99** (1987) 163-170.

21. Subsets of hypersimple sets, *Pacific J. Math.*, **127** (1987) 299-319.
22. Maximal theories, *Annals Pure and Appl. Logic.*, **33** (1987) 245-282.
23. Degrees of splittings and bases of an r.e. vector space, (with J.B. Remmel and L.V. Welch), *Trans Amer. Math Soc.*, **302** (1987) 683-714.
24. Localization of a theorem of Ambos-Spies and the strong anti-splitting property. *Archiv. für Math Logik Grundlagenforschung*, **26** (1987) 127-136.
25.  $\Delta_2^0$  degrees and transfer theorems, *Illinois J. Math.*, **31** (1987) 419-427.
26.  $T$ -degrees, jump classes and strong reducibilities, (with C. Jockusch). *Trans. Amer. Math. Soc.*, **301** (1987) 103-136.
27. Automorphisms and recursive structures, (with J.B. Remmel), *Z. Math. Logik Grund. der Math.*, **33** (1987) 339-345.
28. Two theorems on truth table degrees, *Proc. Amer. Math. Soc.*, **103** (1988), 281-287.
29. Recursively enumerable  $m$ -degrees and  $tt$ -degrees II : the distribution of singular degrees. *Archive for Mathematical Logic*, **27** (1988), 135-148.
30. Intervals and sublattices in the r.e. weak truth table degrees, Part I : density, *Ann. Pure and Appl. Logic*, **41** (1989) 1-27.
31. Completely mitotic r.e. degrees (with T. Slaman), *Ann. Pure and Appl. Logic*, **41** (1989) 119-153.
32. D-r.e. degrees and the nondiamond theorem. *Bull. London Math. Soc.*, **21** (1989) 43-50.
33. Classification of degree classes associated with r.e. subspaces, (with J.B. Remmel), *Ann. Pure and Appl Logic*, **42** (1989) 105-125
34. Degrees bounding minimal degrees, (with C.T. Chong), *Math. Proc. Cambridge Phil. Soc.*, **105** (1989) 211-222.
35. Honest polynomial reductions, non relativizations and  $P =?NP$  (with W. Gasarch, S. Homer and M. Moses) *Proceedings of the 4th Annual Conference on Structures in Complexity Theory*, (1989), IEEE Publ. 196-207.
36. Recursively enumerable  $m$ -degrees and  $tt$ -degrees I : the quantity of  $m$ -degrees. *J. Symb. Logic*, **54** (1989) 553-567
37. On choice sets and strongly nontrivial self-embeddings of recursive linear orders. (with M.F. Moses) *Z. Math. Logik Grundlagen Math.*, **35** (1989) 237-246.
38. Intervals and sublattices in the r.e. weak truth table degrees, Part II : nonbounding, *Ann. Pure and Appl. Logic*, **44** (1989) 153-172
39. On hyper-torre isols, *J. Symbolic Logic*, **54** (1989) 1160-1166

40. A contiguous nonbranching degree, *Z.Math Logic Grundlagen Math.*, **35** (1989) 375-383.
41. On Ramsey-type theorems and their applications, *Singapore Math. Medley*, **17** (1989) 58-78.
42. Lattice nonembeddings and initial segments of the recursively enumerable degrees, *Annals Pure and Appl. Logic*, **49** (1990) 97-119.
43. Automorphism and splittings of recursively enumerable sets, (with M Stob) in *Proceedings of the Forth Asian Logic conference, CSK publication*, Tokyo (1990) 75-87.
44. Array recursive sets and multiple permitting arguments (with M. Stob and C. Jockusch) in *Proceedings Oberwolfach 1989*, Springer Verlag, *Lecture Notes in Mathematics 1990*, 141-174.
45. Notes on the  $\mathbf{0}'''$  priority method with special attention to density theorems, in *Proceedings Oberwolfach 1989*, Springer Verlag, *Lecture Notes in Mathematics 1990*, 111-140.
46. Superbranching degrees, (with J. Mourad) in *Proceedings Oberwolfach 1989*, Springer Verlag, *Lecture Notes in Mathematics 1990*, 175-186.
47. Minimal degrees recursive in 1-generic degrees, (with C.T. Chong), *Annals Pure and Appl. Logic*, **48** (1990) 215-225.
48. On complexity theory and honest polynomial time degrees, *Theoretical Computer Science*, **78** (1991) 305-317.
49. Jumps of hemimaximal sets, (with M. Stob), *Z. Math. Logik Grundlagen Math.*, **37** (1991) 113-120.
50. Recursive linear orderings with incomplete successivities (with M.F. Moses), *Trans. Amer. Math.Soc.*, **326** (1991) 653-668.
51. Automorphisms of the lattice of recursively enumerable sets : Orbits (with M. Stob), *Advances in Math.*, **92** (1992) 237-265.
52. Tabular degrees and  $\alpha$ -recursion theory, (with C. Bailey), *Annals Pure and Applied Logic*, **55** (1992),205-236.
53. Splitting theorems in recursion theory, (with M. Stob) *Annals Pure and Applied Logic*, **65** (1)(1993) 1-106).
54. Orderings with  $\alpha$ -th jump degree  $\mathbf{0}^\alpha$  (with J.F. Knight), *Proc. Amer. Math. Soc.*, **114** (1992) 545-552.
55. On  $\Pi_1^0$  classes and their ranked points, *Notre Dame J. of Formal Logic*, **32** (1991) 499-512.
56. An invitation to structural complexity, *New Zealand Journal of Mathematics*, **21** (1992) 33-91.

57. On co-simple isols and their intersection types (with T. Slaman), *Annals pure and Appl. Logic*, (Special issue in honour of John Myhill), **56** (1992) 221-237.
58. Fixed parameter intractability, (with M. Fellows), *Proceedings Structure in Complexity, Seventh Annual Conference, IEEE Publication*, (1992) 36-50.
59. Fixed parameter tractability and completeness, (with M. R. Fellows), *Congressus Numerantium*, **87** (1992) 161-187.
60. Automorphisms of the lattice of recursively enumerable sets: promptly simple sets (with P. Cholak and M. Stob), *Trans. American Math. Society*, **332** (1992) 555-570.
61. Fixed parameter intractability II, (with K. Abrahamson and M. F. Fellows) in *Proceedings Tenth Annual Symposium on Theoretical Aspects of Computer Science (STACS'93)*(Ed. G. Goos and J. Hartmanis), Springer-Verlag Lecture Notes in Computer Science, Vol 665 (1993) 374-385.
62. Parameterized computational feasibility, (with M. Fellows) in *Feasible Mathematics II* (ed. P. Clote and J. Remmel) Birkhauser (1995) 219-244.
63. Nondiamond theorems for polynomial time reducibility, *Journal of Computing and System Sciences*, **45** (1992) 385-395.
64. Computability Theory and Linear Orderings, in *Handbook of Recursive Mathematics* (ed Ershov, Goncharov, Nerode and Remmel ) Vol 2, North Holland, (1998), 823-977.
65. Effective algebras and relational systems; coding properties (with J.B. Remmel), in *Handbook of Recursive Mathematics* (ed Ershov, Goncharov, Nerode and Remmel) Vol 2, North Holland, (1998), 977-1041.
66. Friedberg splittings of recursively enumerable sets (with M. Stob), *Annals Pure and Applied Logic*, **59** (1993) 175-199.
67. Degrees of inferability (with P. Cholak, L. Fortnow, W. Gasarch, E. Kinber, M. Kummer, S. Kurtz, and T. Slaman), *Proceedings of Colt '92 (Fifth Annual Workshop on Computational Learning Theory, 1992)*, 180-192.
68. On the Cantor-Bendixon rank of recursively enumerable sets, (with P. Cholak), *J. Symbolic Logic*, **58** (1993) 629-640.
69. Countable thin  $\Pi_1^0$  classes, (with D. Cenzer, C. Jockusch, and R. Shore), *Annals Pure and Applied Logic*, **59** (1993) 79-139.
70. Array nonrecursive sets and lattice embeddings of the diamond, *Illinois J. Mathematics*, **37** (1993) 349-374.
71. Embedding Lattices into the wtt-degrees below  $\mathbf{0}'$ , (with C. Haught), *J. Symbolic Logic*, **59** (1994) 1360-1382.
72. Effectively and noneffectively nowhere simple subspaces, (with J.B. Remmel), *Logical Methods* (ed. Crossley, Remmel, Shore, and Sweedler) Birkhauser, Boston, 1994, 314-351.

73. Permutation and presentations (with P. Cholak), *Proc. Amer. Math. Soc.* **122** (1994) 1237-1249.
74. Every recursive boolean algebra is isomorphic to one with incomplete atoms, *Annals Pure and Applied Logic*, **60** (1993) 193-206.
75. Fixed-parameter tractability and completeness II: on completeness for  $W[1]$  (with M. Fellows), *Theoretical Comput. Sci.* **141** (1995) 109-131.
76. Recursively enumerable  $m$ - and  $tt$ -degrees III: realizing all finite distributive lattices (with P. Cholak), *J. London Math. Soc.*, (2) **50** (1994) 440-453.
77. Fixed-parameter tractability and completeness III: some structural aspects of the  $W$ -hierarchy (with M. Fellows) in *Complexity Theory: Current Research* (Ed. K. Ambos-Spies, S. Homer and U. Schöningh) Cambridge University Press, (1993) 166-191.
78. Lattice nonembeddings and intervals in the recursively enumerable degrees, (with P. Cholak), *Annals Pure and Applied Logic*, **61**, (1993), 195-222.
79. Decidability and definability for parameterized polynomial time  $m$ -reducibilities, (with P. Cholak) *Logical Methods*, (ed. Crossley, Remmel, Shore, and Sweedler) Birkhauser, Boston, 1994, 194-221.
80. On irreducible  $m$ -degrees, *Rendiconti Seminario Matematico Dell'Universita e Del Politecnico di Torino*, (Rend. Sem. Mat. Univ. Pol. Torino), **51**, (1993) 109-112.
81. Parameterized learning complexity, (with M. Fellows and P. Evans) in *Proceedings of the Sixth Annual Conference on Computational Learning Theory*, ACM Press, New York, (1993) 51-57.
82. The parameterized complexity of some problems in logic and linguistics, (extended abstract) (with M. Fellows, B. Kapron, M. Hallett, and T. Wareham), in *Proceedings of the Workshop on Structural Complexity and Recursion Theoretical Methods in Logic Programming*, October 29, Vancouver, Canada (ed. Blair, H., V. Marek, A. Nerode, J. Remmel) Mathematical Sciences Institute Publ. (1993) 44-58. Final version in *Logic at St. Petersburg* (Ed. A. Nerode and Yu. Matiyasevich) Springer Verlag Lecture Notes in Computer Science, Vol 813, (1994) 89-101
83. Every low boolean algebra is isomorphic to a recursive one, (with C. Jockusch) *Proceedings Amer. Math. Society*, **122**, No. 3, November 1994, pp. 871-880.
84. Highness and bounding minimal pairs, (with S. Lempp and R. Shore), *Mathematical Logic Quarterly* **39** (1993) 475-491.
85. Fixed-parameter tractability and completeness I: basic results, (with M. Fellows), *SIAM J. Computing* **24** (1995), 873-921.
86. There is no plus-capping degree, (with S. Lempp), *Archive for Mathematical Logic*, **33** (1994) 109-119.

87. Fixed-parameter tractability and completeness IV: on completeness for  $W[P]$  and  $PSPACE$  analogues, (with K. Abrahamson and M. Fellows), *Annals Pure and Applied Logic*, **73**, (1995) 235-276.
88. On the structure of parameterized problems in  $NP$  (extended abstract), (with L. Cai, J. Chen and M. Fellows,) in *Proceedings Eleventh Annual Symposium on Theoretical Aspects of Theoretical Computer Science, 1994* (STACS '94) (Ed. E. Mayr and k. Wagner), Springer-Verlag, Lecture Notes in Computer Science, Vol 775, (1994) 509-520. Final Version in *Information and Computation*, Vol 123 (1995) 38-49.
89. A rank one cohesive set, (with Yue Yang), *Annals Pure and Applied Logic*, **68** (1994) 161-171.
90. The parameterized complexity of sequence alignment and consensus, (extended abstract) (with H. Bodlaender, M. Fellows, and H. Todd Wareham), in *Combinatorial Pattern Matching*, (5th Annual Symposium, CPM'94, Asilomar June 1994) (Ed. Maxime Crochemore and Dan Gusfield) Lecture Notes in Computer Science Vol 807 (1994) 15-30.
91. Parameterized Complexity Analysis in Computational Biology, (with H. Bodlaender, M. Fellows, M. Hallett, and H. Todd Wareham), in *IEEE Computer Society Workshop on Shape and Pattern Matching in Computational Biology*, held in conjunction with the 1994 IEEE Conference on Computer Vision and Pattern Recognition, June 1994. Final Version appeared in *Computer Applications in the Biosciences*, **11**, (1995), 49-57
92. The Parameterized Complexity of Short Computation and Factorization, (with L. Cai, J. Chen and M. Fellows), Proceedings of the *Sacks Symposium*, in *Archive for Mathematical Logic*, Vol. 36, No 4/5 (1997), 321-338.
93. The structure of honest polynomial  $m$ -degrees, (with B. Gasarch and M. Moses), *Annals of Pure and Applied Logic*, **70** (1994), 1-27.
94. The parameterized complexity of sequence alignment and consensus, (with H. Bodlaender, M. Fellows and H. Todd Wareham), *Theoretical Computer Science*, **147**, (1995) 31-54.
95. Lattice embedding below a non- $low_2$  recursively enumerable degree, (with R. Shore), *Israel Journal of Mathematics*, **94** (1996), 221-246.
96. Degree theoretical definitions of the  $low_2$  recursively enumerable sets, (with R. Shore), *J. Symbolic Logic*, **60** (1995) 727-756.
97. Advice classes of parameterized tractability, (with L. Cai, J. Chen, and M. Fellows), *Ann. Pure and Applied Logic*, **84** (1997), 119-138.
98. On the structure of parameterized problems in  $NP$ , (with L. Cai, J. Chen and M. Fellows,), *Information and Computation*, **123** (1995), 38-49.

99. Array nonrecursive degrees and genericity, (with C. Jockusch and M. Stob) in *Computability, Enumerability, Unsolvability*, (ed. Cooper, Slaman, and Wainer), London Mathematical Society Lecture Notes Series Vol 224, Cambridge University Press (1996), 93-105.
100. (with S. Lempp and R. Shore) Jumps of minimal degrees below  $\mathbf{0}'$ , *Journal of the London Mathematical Society*, **54**, No. 2 (1996), 417-439.
101. There is no fat orbit, (with L. Harrington) *Annals of Pure and Applied Logic*, **80** (1996), 227-289.
102. Parameterized circuit complexity and the W-hierarchy, (with M. Fellows and K. Regan), *Theoretical Computer Science*. Vol. 191 (1998), 97-115.
103. Minimal pairs in initial segments of the recursively enumerable degrees, (with M. Stob), *Israel Journal of Mathematics*, **100** (1997), 7-27
104. On presentations of algebraic structures, in *Complexity, Logic and Recursion Theory*, (A. Sorbi, ed.), Marcel Dekker, Lecture Notes in Pure and Applied Mathematics, Vol. 197 (1997), 157-206.
105. There is no degree invariant half jump, (with R. Shore), *Proceedings of the American Mathematical Society*. Vol. 125 (1997), 3033-3037.
106. Contiguity and distributivity in the enumerable degrees, (with S. Lempp), *Journal of Symbolic Logic*, Vol. 62 (1997), 1215-1240. (Corrigendum in *ibid* Vol 67 (2002) 1579-1580.)
107. On the universal splitting property, *Mathematical Logic Quarterly*, **43** (1997) 311-320.
108. Intervals without critical triples, (with P. Cholak and R. Shore), in *Logic Colloquium '95*, (Ed. Johann A. Makowsky and Elena V. Ravve), Lecture Notes in Logic, Vol. 11, Springer-Verlag (1998) 17-43.
109. The parameterized complexity of relational database queries and an improved characterization of  $W[1]$ , (with M. Fellows and U. Taylor), in *Combinatorics, Complexity and Logic*, Proceedings of DMTCS '96, (D. Bridges, C. Calude, J. Gibbons, S. Reeves, I Witten, Eds) Springer-Verlag (1996), 194-213.
110. Difference sets and computability theory, (with Z. Feuredi, C. Jockusch, and L. Rubel), *Annals Pure and Applied Logic*. Vol. 93 (1998), 63-72.
111. Undecidability results for low complexity degree structures, (with A. Nies), in *Proceedings Complexity Theory, 12th Annual Conference*, (1997) 128-132.
112. Splitting Theorems and the Jump Operator, (with R. Shore) *Annals Pure and Applied Logic*, Vol. 94 (1998), 45-52.
113. On computing graph minor obstruction sets, (with Kevin Cattell Michael J. Dinneen, Michael R. Fellows, and Michael A. Langston) *Theor. Comp. Science*. Vol. 233 (2000), 107-127.

114. Threshold dominating sets and an improved characterization of  $W[2]$ , (with M. Fellows) *Theoretical Computer Science* Vol. 209 (1998), 123-140.
115. Descriptive complexity and the  $W$ -hierarchy, (with M. Fellows and K. Regan), in *Proof Complexity and Feasible Arithmetic* AMS-DIMACS Proceedings Series Vol. 39, (1998) (P. Beame and S. Buss, ed.), 119-134.
116. Effective presentability of Boolean algebras of Cantor–Bendixson rank 1, with C. Jockusch, *Journal of Symbolic Logic*, Vol. 64 (1999), 45-52.
117. Infima in the recursively enumerable weak truth table degrees (with R. Blaylock and S. Lempp) *Notre Dame J. Formal Logic* Vol 38 (1997), 406-419.
118. The Parameterized Complexity of Some Fundamental Problems in Coding Theory, (with M. Fellows, G. Whittle and Alexander Vardy) *SIAM J. Comput.* Vol. 29 (1999), 545-570.
119. A note on the computability of graph minor obstruction sets for monadic second order ideals, (with B. Courcelle and Mike Fellows), *Journal of Universal Computer Science*, Vol. 3 (1997), 1194-1198
120. Enumerable sets and quasi-reducibility, (with G. LaForte and A. Nies), *Annals of Pure and Applied Logic* Vol. 95 (1998), 1-35.
121. Parameterized complexity: a systematic method for confronting computational intractability, (with M. Fellows and U. Stege) *Contemporary Trends in Discrete Mathematics*, (R. Graham, J. Krachovil, J. Nesetril, and F. Roberts, eds) DIMACS Vol. 49, American Mathematical Society, (1999) 49-100.
122. Computational tractability: the view from mars, (with M. Fellows and U. Stege) *Bulletin of the European Association for Theoretical Computer Science*, No. 69, (1999), 73-97.
123. Parameterized complexity after (almost) 10 years: Review and Open Questions, (with Mike Fellows), in *Combinatorics, Computation & Logic*, Springer-Verlag, 1999, 1-33.
124. Uniformly hard languages (with L. Fortnow.) in *Complexity Theory, Annual Conference, 1998*, 228-235. Journal Version in *Theoretical Computer Science*, 298(2):303-315, 2003
125. Initial segments of computable linear orderings. (with B. Khoussainov and R. Coles) *Order* Vol. 14 (1997-1998), 107-124
126. Index sets and parametric reductions, (with M. Fellows) *Archive for Mathematical Logic*. Vol. 40 (2001), 329-348.
127. On the proof theoretical strength of the Dushnik-Miller theorem for countable linear orderings, (with S. Lempp) in, *Recursion Theory and Complexity*, (Arslanov and Lempp, eds) de Gruyter, 1999, 55-58.
128. A  $\Delta_2$  set of barely  $\Sigma_2$  degree, (with G. LaForte and S. Lempp) *Journal of Symbolic Logic*, Vol. 64 (1999), 1700-1718.

129. A note on btt-degrees, *Rendiconti Seminario Matematico Dell'Universita e Del Politecnico di Torino*, (Rend. Sem. Mat. Univ. Pol. Torino), Vol 58 (2000), 449-456.
130. The Complexity of Irredundant Sets Parameterized By Size, (with M. Fellows and V. Raman), *Discrete Applied Math.* Vol. 100 (2000), 155-167.
131. Undecidability results for low complexity time classes, (with A. Nies) *Journal of Computing and Sys. Sci.* Vol. 60 (1999), 465-479.
132. Every set has a least jump enumeration, (with R. Coles and T. Slaman) *Journal London Math. Soc.* (2) Vol. 62 (2000), 641-649.
133. Computability, Definability and Algebraic Structures, in *Proceedings of the 7th and 8th Asian Logic Conferences*, World Scientific, 2003, 63-102.
134. Some Orbits for  $\mathcal{E}$ , (with Peter Cholak and E. Herrmann) *Annals Pure and Applied Logic* Vol. 107 (2001), 193-226.
135. Genericity and Ershov's Hierarchy, (with Amy Gale) *Mathematical Logic Quarterly* Vol. 47 (2) (2001), 161-182.
136. A  $\Delta_2^0$  set with no low subset in it or its complement, (with D. Hirschfeldt, S. Lempp, and R. Solomon) *Journal of Symbolic Logic* Vol. 66 (2001), 1371-1381.
137. Questions in computable algebra and combinatorics, (with J. Remmel) in *Computability Theory and its Applications*, (Cholak, Lempp, Lermann, and Shore eds.), Contemporary Math, Vol. 257, AMS Publ., 2000, 95-126.
138. Automorphisms of the lattice of  $\Pi_0^1$  classes: perfect thin classes and anr degrees, (with P. Cholak, R. Coles and E. Herrmann) *Trans. Amer. Math. Soc.* Vol. 353 (2001), 4899-4924.
139. Presentations of computably enumerable reals, (with G. LaForte) *Theoretical Computer Science* Vol. 284 (2002), 539-555.
140. Maximal contiguous degrees, (with P. Cholak and R. Walk) *Journal of Symbolic Logic* Vol. 67 (2002), 409-437.
141. Randomness, computability, and density, with D. Hirschfeldt and A. Nies, *SIAM J. Comput.* Vol. 31 (2002), 1169-1183. (Extended abstract appeared in *Symposium for Theoretical Aspects of Computer Science, STACS'01* January, 2001. Lecture Notes in Computer Science, Springer-Verlag, (Ed A. Ferriera and H. Reichel, 2001, 195-201)
142. Parameterized Complexity for the Skeptic, in *Computational Complexity, 18th Annual Conference*, IEEE, 2003, 147-169.
143. The reverse mathematics of the Nielson-Schrier Theorem, (with D. Hirschfeldt, S. Lempp, and R. Solomon) in *Proceedings International Conference on Mathematical Logic Honouring Ershov on his 60th Birthday and Mal'tsev on his 90th Birthday*, (ed. Goncharov et. al.), Novosibirsk, 2002, 59-71.

144. Uniformity in Computable Structure Theory, (with D. Hirschfeldt and B. Khoussainov), *Algebra and Logic* Vol. 42, No. 5, 2003, 318-332.
145. Degree Spectra of relations on boolean algebras, (with S. Goncharov and D. Hirschfeldt) *Algebra and Logic* Vol. 42, No. 2, 2003, 105-111.
146. Computably Enumerable Reals and Uniformly Presentable Ideals, (with S. Terwijn) *Archive for Mathematical Logic* Vol. 48 (2002), 29-40.
147. Decomposition and infima in the c.e. degrees, (with G. LaForte and R. Shore) *Journal of Symbolic Logic* Vol. 68 (2003), 551-579.
148. Computability-theoretical and proof-theoretical aspects of partial and linear orderings, (with D. Hirschfeldt, S. Lempp, and R. Solomon) *Israel J. Math.* vol 138, 2003, pp 271-289.
149. Complementing Cappable Degrees in the Difference Hierarchy (with A. Li and G. Wu), *Annals of Pure and Applied Logic.* Vol. 125 (2004), 101-118.
150. The Kolmogorov Complexity of Random Reals, with Yu Liang and Ding Decheng *Annals of Pure and Applied Logic* Volume 129, Issues 1-3 , (2004), 163-180
151. Some Computability-Theoretical Aspects of Reals and Randomness, in *The Notre Dame Lectures*, (Peter Cholak, ed.) Vol. 18 in the *Lecture Notes in Logic* series published by the Association for Symbolic Logic. (2005) 97-146.
152. Hahn's Theorem, Archimedean Classes and reverse mathematics, (with Reed Solomon), *Reverse Mathematics, 2001 Lecture Notes in Logic* Vol 21 (ed. S. Simpson). Association for Symbolic Logic, A. K. Peters, Massachusetts (2005) 147-163.
153. Randomness and reducibility, (with G. LaForte and D. Hirschfeldt) extended abstract appeared in *Mathematical Foundations of Computer Science, 2001* J. Sgall, A. Pultr, and P. Kolman (eds.), *Mathematical Foundations of Computer Science 2001, Lecture Notes in Computer Science 2136* (Springer, 2001), 316-327). final version in *Journal of Computing and System Sciences.* Vol. 68 (2004), 96-114.
154. Trivial Reals, with D. Hirschfeldt A. Nies and F. Stephan, extended abstract in *Computability and Complexity in Analysis* Malaga, (Electronic Notes in Theoretical Computer Science, and proceedings, edited by Brattka, Schröder, Weihrauch, FernUniversität, 294-6/2002, 37-55), July, 2002. Final version appears in *Proceedings of the 7th and 8th Asian Logic Conferences*, World Scientific, 2003, 103-131.
155. Cutting Up Is Hard To Do: the Parameterized Complexity of  $k$ -Cut and Related Problems, (with Vladimir Estivill-Castro, Michael R. Fellows, Elena Prieto-Rodriguez and Frances A. Rosamond) *Electronic Notes in Theoretical Computer Science*, Vol. 78 (2003), 205-218.
156. Invariance and noninvariance in the lattice of  $\Pi_1^0$  classes, (with P. Cholak), *Journal of the London Mathematical Society* (2) Vol. 70 (2004), 735-749.

157. On Schnorr randomness, (with Evan Griffiths), extended abstract in *Computability and Complexity in Analysis* Malaga, (Electronic Notes in Theoretical Computer Science, and proceedings, edited by Brattka, Schröder, Weihrauch, FernUniversität, 294-6/2002, 25-36) July, 2002. Final version in *Journal of Symbolic Logic*. Vol 69 (2) (2004), 533-554.
158. On Kurtz randomness, (with E. Griffiths and S. Reid) *Theoretical Computer Science* Vol. 321 (2004), 249-270.
159. On Schnorr and computable randomness, martingales, and machines, with E. Griffiths and G. LaForte. *Mathematical Logic Quarterly*. Vol. 50, No 6 (2004), 613-627.
160. Completing pseudojump operators, (with R. Coles, C. Jockusch and G. LaForte) *Annals of Pure and Applied Logic*. Vol. 136 (2005), 297-333.
161. Degrees of d.c.e. reals, (with G. Wu and X. Zheng) *Mathematical Logic Quarterly*. Vol. 50 (2004), 345-350.
162. There are no low maximal d.c.e. degrees, (with Yu Liang) *Notre Dame Journal of Formal Logic*, Vol. 45 (2004), 147-159.
163. Some recent progress in algorithmic randomness, in *Proceedings of the 29 th Annual Conference on Mathematical Foundations of Computer Science, Prague, August 2004* (invited paper) (J. Fiala, V. Koubek and J. Kratochvil eds), Springer-Verlag, Lecture Notes in Computer Science, Vol. 3153 (2004), 42-81.
164. A basis theorem for  $\Pi_1^0$  classes of positive measure with applications to random reals, (with J. Miller) *Proceedings of the American Mathematical Society*. Vol. 134 (2006), 283-288.
165. (with Catherine McCartin) Online problems, pathwidth, and persistence, *Proceedings IWPEC 2004*. Springer-Verlag Lecture Notes in Computer Science 3162, pp 13-24, 2004.
166. On Self-Embeddings of Computable Linear Orderings (with C. Jockusch and J. Miller) *Annals of Pure and Applied Logic* Volume 138, Issues 1-3 (2006), 52-76.
167. Bounded persistence pathwidth, (with Catherine McCartin) in *Proceedings of CATS 2005, Computing, The Australasian Theory Symposium*, Conferences in Research and Practice in Information Technology, Vol 41, pp 51-56, 2005.
168. Some New Directions and Questions in Parameterized Complexity, (with Catherine McCartin), *Developments in Language Theory, 2004*, (Edited by C. Calude, E. Calude, and M. Dinneen) Springer Verlag Lecture Notes in Computer Science Vol. 3340 (2004), 12-26. (Invited Paper)
169. Schnorr dimension (with W. Merkle and J. Reimann) preliminary version appeared in *Computability in Europe, 2005*, Springer-Verlag Lecture Notes in Computer Science Vol. 3526 (2005) 96-105. Final version in *Mathematical Structures in Computer Science* Vol. 16 (2006), 789-811.

170. Five Lectures on Algorithmic Randomness, in *Computational Prospects of Infinity, Part I: Tutorials* (Ed. C. Chong, Q. Feng, T. A. Slaman, W. H. Woodin and Y. Yang) Lecture Notes Series, Institute for Mathematical Sciences, National University of Singapore Vol 14, World Scientific, Singapore, 2008, 3-82.
171. Relativizing Chaitin's Halting Probability (with D. Hirschfeldt, J. Miller, and A. Nies) *Journal of Mathematical Logic*. Vol. 5 (2005), 167-192.
172. Arithmetical Sacks Forcing, (with Liang Yu) *Archive for Mathematical Logic*, Vol. 45, No 6. (2006), 715-720.
173. Totally  $< \omega^\omega$ -computably enumerable degrees and  $m$ -topped degrees, (with Noam Greenberg), in Proceedings of *TAMC 2006: Theory and Applications of Models of Computation*, (Jin-Yi Cai, S. Barry Cooper, and Angsheng Li, eds), Springer-Verlag Lecture Notes in Computer Science, Vol. 3959, (2006) 46-60.
174. Every 1-generic computes a properly 1-generic, (with Barbara Csima, Noam Greenberg, Denis Hirschfeldt, and Joe Miller), *Journal of Symbolic Logic*. Vol. 71, No. 4 (2006), 1385–1393.
175. Algorithmic randomness and computability, *Proceedings of the 2006 International Congress of Mathematicians*, Vol 2, *European Mathematical Society*, (2006), 1-26.
176. Lowness and  $\Pi_2^0$  nullsets, (with Andre' Nies, Yu Liang and Rebecca Weber) *Journal of Symbolic Logic* Vol. 71 (2006), 1044-1052.
177. Prompt Simplicity, Array Computability and Cupping, (with Noam Greenberg, Joe Miller, and Rebecca Weber), *Computational Prospects of Infinity: Part II Presented Talks* (Ed. C. Chong, Q. Feng, T. A. Slaman, W. H. Woodin and Y. Yang) Lecture Notes Series, Institute for Mathematical Sciences, National University of Singapore Vol 15, World Scientific, Singapore, 2008, 59-79.
178. Lowness for Computable Machines, (with Noam Greenberg, Nenad Mihailović, and A. Nies) *Computational Prospects of Infinity: Part II Presented Talks* (Ed. C. Chong, Q. Feng, T. A. Slaman, W. H. Woodin and Y. Yang) Lecture Notes Series, Institute for Mathematical Sciences, National University of Singapore Vol 15, World Scientific, Singapore, 2008, 79-87.
179. Online promise problems with online width metrics, (with Catherine McCartin) *Journal of Computing and System Sciences*, Vol. 73, No. 1 (2007), 57-72.
180. Parameterized approximation problems, (with Mike Fellows and Catherine McCartin), in *International Workshop in Parameterized Complexity and Exact Computation, IWPEC, 2006*, (H. Bodlaender and M. Langston, Eds.), Springer-Verlag Lecture Notes in Computer Science, Vol. 4169 (2006), 121-129.
181. Calibrating randomness, (with Denis Hirschfeldt, Andre Nies, and Sebastiaan Terwijn) *Bulletin of Symbolic Logic*, Vol. 12 (2006), 411-491.
182. *The Sixth Lecture on Algorithmic Randomness, Logic Colloquium 2006*, (S.B. Cooper, H. Geuvers, A. Pillay, and J. Vaananen, eds) Lecture Notes in Logic, Cambridge University press/ASL Publ., 2009, 103-134.

183. Undecidability of the structure of the Solovay degrees of c.e. reals, (with D. Hirschfeldt and G. LaForte) *Journal of Comput. and Sys. Sci.* Vol. 73 (2007), 769-787
184. Subspaces of computable vector spaces, (with D. Hirschfeldt, A. Kach, S. Lempp, J. Mileti, and A. Montalbán). *Journal of Algebra.* Vol. 314 (2007), 888-894.
185. Ideals in computable rings, (with S. Lempp, and J. Mileti) *Journal of Algebra* Vol. 314 (2007), 872-887.
186. Bounded fixed-parameter tractability and reducibility, (with J. Flum, M. Grohe, and M. Weyer) *Annals of Pure and Applied Logic* Vol. 148 (2007), 1-19.
187. Parameterized Algorithms, (with Catherine McCartin) in *Handbook of Algorithms and Complexity, Second Edition* (M. Atallah and M. Blanton, eds), CRC press, Boca Raton, USA, 2009, pp 25-1 to 25-30.
188. Strong jump traceability I, the computably enumerable case (with Peter Cholak and Noam Greenberg) *Advances in Mathematics* Vol. 217 (2008), 2045-2074.
189. The upward closure of a perfect thin class, (with Noam Greenberg and Joe Miller), *Annals of Pure and Applied Logic*, Vol. 165 (2008), 51-58.
190. The Complexity of Orbits of Computably Enumerable Sets, (with Peter Cholak and Leo Harrington), *Bulletin of Symbolic Logic.* Vol. 14, No. 1 (2008), 69-87.
191. On the orbits of computably enumerable sets, (with P. Cholak and L. Harrington) *Journal of the American Mathematical Society* Vol. 21, No. 4 (2008), 1105-1135.
192. Slender Classes, (with A. Montalbán) *Journal of the London Mathematical Society*, Vol. 78, No. 1 (2008), 36-50.
193. Totally  $< \omega$  computably enumerable degrees and bounding critical triples, (with Noam Greenberg and Rebecca Weber), *Journal of Mathematical Logic*, Vol. 7 (2007), 145 - 171.
194. Degree spectra of unary relations on  $(\omega, \leq)$ , (with Bhakhadyr Khoussianov, Joseph Miller and Liang Yu), in *proceedings of the International Congress in Logic, Methodology and Philosophy of Science, Beijing, 2007*. King's College Publications, London, 2009, 36-55.
195. (with A. Montalbán) The isomorphism problem for torsion-free abelian groups is analytic complete, *Journal of Algebra.* Vol. 320 (2008), 2291-2300.
196. Parameterized approximation of dominating set problems, (with M. Fellows, C. McCartin and F. Rosamond), *Information Processing Letters* Vol. 109(1) (2008), 68-70.
197. Turing degrees of reals of positive effective packing dimension, (with Noam Greenberg) *Information Processing Letters.* Vol. 108 (2008), 298-303.
198. The Computer Journal Special Issue: Foreword by Guest Editors, (with Mike Fellows and Mike Langston), *The Computer Journal*, Vol. 51, No 1. (2008), 1-6.

199. On Problems without Polynomial Kernels (Extended Abstract), (with Hans Bodlaender, Mike Fellows, and Danny Hermelin) in Proceedings of *Automata, Languages and Programming, 35th International Colloquium, ICALP 2008*, Reykjavik, Iceland, July 7-11, 2008, Proceedings, Part I: Track A: Algorithms, Automata, Complexity, and Games. Lecture Notes in Computer Science 5125 Springer 2008, 563-574. Final version in *Journal of Computing and System Sciences*. Vol. 75( No. 8): 423-434 (2009)
200. Working with strong reducibilities above totally  $\omega$ -c.e. degrees, (with George Barmpalias and Noam Greenberg) *Transactions of the American Mathematical Society*, Vol. 362 (2010), 777-813.
201. K-trivial degrees and the jump traceability hierarchy, (with George Barmpalias and Noam Greenberg), *Proceedings of the American Mathematical Society*. Vol. 137 (2009), 2099-2109.
202. Kolmogorov complexity and Solovay functions, (with Laurent Bienvenu) in *Proceedings STACS 2009* in *Leibniz International Proceedings in Informatics* (Susanne Albers and Jean-Yves Marion, Eds) Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik, Germany, 2009, 157-158.
203. On computable self embeddings of computable linear orderings, (with Bart Kastermans and Steffen Lempp) *Journal of Symbolic Logic*, Vol. 74 (4) (2009) 1352-1366.
204. Space Complexity of Abelian Groups (with D. Cenzer, J.B. Remmel and Z. Uddin) *Archive for Math. Logic*, Vol. 48 (2009), 63-76.
205. Lowness for Demuth randomness, (with Keng Meng Ng) in *Mathematical Theory and Computational Practice*, (Proceedings CiE 2009) Ambos-Spies, Löwe, Merkle, eds, Springer-Verlag, LNCS 5635, (2009) 154-166.
206. Limits on jump inversion for strong reducibilities, (with Barbara Csima and Keng Meng Ng), *Journal of Symbolic Logic*. Vol. 76, No. 4 (2011), 1287-1296.
207. Effective packing dimension and traceability, (with Keng Meng Ng), accepted for publication in *Notre Dame Journal of Formal Logic*.
208. Jump inversions inside effectively closed sets with applications to randomness, (with George Barmpalias and Keng Meng Ng), *Journal of Symbolic Logic*. Vol. 74, No. 2 (2011), 491-508.
209. Binary trees with few labelled paths, with Noam Greenberg, Carl Jockusch and Kevin Milans. *Combinatorica* Vol. 31, No 3 (2011), 285-303.
210. Extensions of embeddings below computably enumerable degrees, (with Noam Greenberg, Andrew Lewis, and Antonio Montalbán) to appear *Transactions of the American Mathematical Society*
211. Algorithmic randomness and complexity, in *Randomness Through Computation*, (H. Zenil, Ed) World Scientific, Singapore, 2011, 223-241.

- 212. Decidability and computability of certain torsion-free Abelian groups, (with Asher Kach, Sergei Goncharov, Julia Knight, Oleg Kudinov, Alexander Melnikov, and Dan Turetsky) *Notre Dame Journal of Formal Logic*. Vol. 51 (2010), 85-97.
- 213. Euclidean functions of computable Euclidean domains, (with Asher Kach), *Notre Dame Journal of Formal Logic*. Vol. 52 (No 2) (2011), 163-172.
- 214. Limitwise monotonic functions and their applications, (with Asher Kach and Dan Turetsky), in *Proceedings of the 11th Asian Logic Conference, 2009*. (Ed. T. Arai, Q. Feng, B. Kim, G. Wu and Y. Yang) World Scientific, 2012, 59-87.
- 215. On the complexity of the successivity relation in computable linear order ings, (with Steffen Lempp and Guohua Wu) *Journal of Mathematical Logic*. Vol. 10 (2010), 83-99.
- 216. Strong jump traceability II: K-triviality. (with Noam Greenberg) to appear, *Israel Journal of Mathematics*.
- 217. Confronting intractability via parameters, (with Dimitrios Thilikos) *Computer Science Review*. Vol. 5 (2011), 279-317
- 218. Effective categoricity of abelian groups, (with Alexander Melnikov) submitted.
- 219. On computable categoricity, (with Asher Kach, Steffen Lempp, and Dan Turetsky) submitted
- 220. Pseudo-jump operators and SJTHard sets, (with Noam Greenberg) submitted
- 221. Bounded randomness (with Paul Brodhead and Selwyn Ng), Festschrift for the 60th Birthday of Cris Calude (M. Dinneen, B. Khoussainov eds), Lecture Notes in Computer Science, Vol. 7160, Springer-Verlag, 2012, 59-70.

### **Papers in preparation**

- 222. On minimal wtt degrees and computably enumerable Turing degrees, (with Reed Solomon, and Keng Meng Ng) being written.
- 223. Asymptotic density and computably enumerable sets, with Jockusch and Schupp.
- 224. Some New Natural Definable Degree Classes, (with Noam Greenberg)
- 225. A hierarchy of new definable degree classes, (with Noam Greenberg)
- 226. Splitting Theorems for computably enumerable degrees, (with Keng meng Ng), in preparation.
- 227. Index sets and  $\Pi_1^0$  classes, (with Ng and Csima) being written.
- 228. Undecidability results for parameterized reducibilities, (with G. LaForte and A. Sorbi)
- 229. Degrees of members of thin classes, (with J. Miller, Y. Yang and G. Wu)
- 230. On models of algorithmic dimension two, (with S. Goncharov and D. Hirschfeldt)

### **Professional Societies:**

I am a member of the following societies American Math. Society (life member), Australian Math. Society, New Zealand Math. Society, European Association for Theoretical Computer Science, London Math. Society, Association for Symbolic Logic, (Council) Combinatorial Mathematics Society of Australasia (life member), Royal Society of New Zealand, Wellington Mathematical Society, The Association for Computing Machinery (life member).

### **Other Information:**

I am a reviewer for Mathematical Reviews, Zentralblatt für Mathematik, and the Journal of Symbolic Logic. For these I have over 250 reviews including 12 book reviews. I am a referee for various journals such as the Journal of Symbolic Logic, Annals of Pure and Applied Logic, the Transactions of the American Math. Society, the Archive for Mathematical Logic, Theoretical Computer Science, Journal of Computer and System Sciences, Journal of Computing and System Sciences, SIAM Journal of Computing, Journal of Graph theory, and the Australasian Journal of Combinatorics. I have been on numerous programme committees for Computer Science and logic meetings. I have given numerous invited addresses at international meetings and colloquia.

For instance, here are some recent invited lectures:

- 2002 September Plenary and Keynote (first) speaker, 8th Asian Logic Conference, Chongqing China.
- 2002 July Plenary and closing address to the international meeting at Schloss Dagstuhl on Parameterized Complexity.
- 2002 January Plenary speaker at the Annual meeting of the Association for Symbolic Logic, San Diego.
- 2002 January Keynote speaker for special session on Computability Theory for the American Mathematical Society Winter Meetings, San Diego.
- 2003 August Keynote speaker in the Kolomogorov Centenary meeting in Heidelberg.
- 2003 July Plenary Speaker in the Annual Conference on Computational Complexity, Aarhus, Denmark.
- 2003 September, Plenary speaker at the Conference on Computability and Complexity in Analysis, Cincinnati, USA.
- 2004 January Plenary Speaker at the international meeting VIC 2004, Wellington, 2004.
- 2004 July Invited Tutorial Speaker (3 lectures) NZIMA Combinatorics Program: Workshop on Combinatorics and its Applications, Auckland
- 2004 August, Plenary Speaker at the Annual Mathematical Foundations of Computer Science, Prague.

- 2004 December Joint Plenary speaker at Automata, Structures and Logic and Developments in Language Theory, Auckland.
- 2005 February Plenary Speaker at the UCLA Meeting for the opening of its Logic Center, sponsored by the ASL, NSF and UCLA.
- 2005 May. Invited speaker at University of Chicago for 4 lectures on algorithmic randomness, whilst Visiting Scholar.
- 2005 July-August. One of the only 2 invited Tutorial Speakers (in computability theory, the second month, the other being Ted Slaman at Berkeley) at the 2 month meeting Computational Prospects of Infinity, Singapore. Five Lectures on Algorithmic Randomness.
- 2005 September Invited Speaker at the 16th Australasian Workshop on Combinatorial Algorithms
- 2006 May. Plenary speaker at Theory and Applications of Models of Computation, Beijing.
- 2006 July. Tutorial Speaker at The European Logic Colloquium, Nijmegen, Holland. Three Lectures.
- 2006 August. Invited 45 minute Speaker, International Congress of Mathematicians, Madrid.
- 2007 August. Invited Lecture, International Congress of Logic Methodology and Philosophy of Science, Beijing.
- 2007 December. Plenary Lecture, First Joint Meeting of the New Zealand Mathematical Society and the American Mathematical Society, Wellington.
- 2008 February, Tutorial speaker, NZIMA Algorithmics Meeting, Napier.
- 2008 March, Invited speaker, American Math. Society Special Session on Computability, Irvine.
- 2008 June, Invited Speaker, Logic Computability and Randomness, Nanjing, China.
- 2008 December, Invited Speaker, special session on algorithmics, NZMS/Aust MS annual Meeting, Christchurch.
- 2009 February, Royal Society Invited Speaker for Rutherford Foundation Dinner, Wellington Town Hall.
- 2009 May, Invited Speaker, Algorithmic Randomness Meeting, Madison.
- 2009 June, Plenary Speaker, Asian Logic Meeting, Singapore.
- 2010 May, Invited Speaker, Midwest Computability Seminar, University of Chicago.
- 2010 May, Plenary Speaker, 5th Logic, Computability and Randomness Conference, University of Notre Dame, USA.

- 2011 February, Plenary Speaker, 6th Computability and Randomness Conference, Cape Town, South Africa.
- 2011 July, Invited Speaker Computational prospects of Infinity II, National University of Singapore.

I am also a reviewer for various granting bodies such as the New Zealand-U.S. Cooperative Science Foundation, and the United States National Science Foundation (both in Mathematics and Computer Science), European Research Council, NSERC (Canada), EPSRC, the Irish NSF, and the Chinese NSF.

From 1987-1996 I edited the New Zealand Mathematical Society publication “Postgraduate Topics in Mathematics and Related Areas”.

I have been a member of the Publications Committee of the New Zealand Mathematical Society, the Committee of the Wellington Mathematical Society, was a member of the Board of Governors of Newlands College from 1987-1989, and am currently a member of the Council and the Australasian Committee of the Association for Symbolic Logic. I served on the National Committee for Mathematics of the Royal Society from 1992-1995, and 2000-. In 1991 I was on the organising committee of the New Zealand Association of Mathematics Teachers Biennial Conference. In 2000, I organized the major NZMRI summer meeting in Kaikoura. In 2002, I am co-organizing the NZMRI meeting in New Plymouth. I co-organized the VIC 2004 meeting in Wellington, and 4 conferences on parameterized complexity and exact computation, such as Dagstuhl 2005. I have been on many conference committees for computer science conferences.

In 1997 I was on the Marsden Mathematical and Information Sciences panel. I currently chair this panel. Since 1997, I have been on the Royal Society of New Zealand Fellows Committee for Mathematical and Information Sciences, and since 1999 I have served as the Fellows representative on the New Zealand National Mathematical & Information Sciences Advisory Group.

My name appears in -Marquis “Who’s Who in the World”, and “Who’s Who Aotearoa”.