

Curriculum Vitae

Dr. Toby Walsh
Research Professor
NICTA and School of CSE
University of New South Wales
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Date of birth: 11/4/64
Nationality: British
Marital status: Married

Education & Employment

St John's College, University of Cambridge

1983-1986. B.A. (Hons) in Mathematics and Theoretical Physics.

Department of Artificial Intelligence, University of Edinburgh

1986-1987. M.Sc. in IT: Knowledge Based Systems (Foundations of AI).
1987-1990. Ph.D. on "A Theory of Abstraction", supervised by Alan Bundy
1990-1992. SERC PostDoctoral Research Fellow.
1997-date. Honorary Research Fellow.

INRIA-Lorraine, Nancy, France

1993-1994. Marie Curie European PostDoctoral Research Fellow.

University of Genova, and IRST, Trento, Italy

1994-1996. Marie Curie European PostDoctoral Research Fellow.

Department of Computer Science, University of Strathclyde

1996-1999. Research Fellow.

Department of Computer Science, University of York

1999-2002. Advanced Research Fellow.

Research School of Information Sciences and Eng., Australian National Univ.

Jan 1999, Dec 2000, Dec 2001, Dec 2002, Dec 2003, Dec 2004. Visiting Fellow.

University College Cork, Ireland

2002-2004. SFI Research Professor at the Cork Constraint Computation Centre.

National ICT Australia and UNSW, Australia

2004-date. Researcher at NICTA and Professor in the School of CSE.

Uppsala University, Sweden

2004-date. External Professor at the Department of Information Science.

Awards

2008. AAAI fellow.
2006. CP 2006. Best Poster award (with Claude-Guy Quimper).
2006. ECAI 2006. Best Poster award (with Maria Silvia Pini, Francesca Rossi, and Brent Venable).
2006. ECAI 2006. One of the best 10 papers (with Kostas Stergiou).
2004. ECAI 2004. One of the best 10 papers (with Emmanuel Hebrard and Brahim Hnich).
2003. ECCAI fellow.
2000. AAAI Outstanding Paper (with Simon Colton and Alan Bundy).
1992. Royal Society European Exchange Fellow.
1983. Open Scholarship at St John's College, Cambridge.

Grants

2004-2007. Collaborator on ARC grant, AU\$ 250k.
2002-2007. Principle Investigator on SFI grant, 1.5 MEuro.
2002-2003. Investigator on EPSRC visiting fellowship, £59k.
2001-2004. Area Coordinator on EU Network of Excellence, £40k.
2001-2003. Principle Investigator on EPSRC grant, £105k.
2000-2003. Principle Investigator on EPSRC grant, £245k.
1999-2004. EPSRC Advanced Research Fellowship, £250k.
1999-2002. Investigator on EPSRC grant, £170k.
1996-1999. Investigator on EPSRC grant, £158k.
1994-1996. Marie Curie PostDoc, £70k.
1993-1994. Marie Curie PostDoc, £35k.
1991. British Council/CNR award to visit Trento, approximate value of £3k.
1990-1992. SERC PostDoc, £70k.

Publications

Proceedings and Books

1. F. Rossi, P. van Beek, and T. Walsh (Editors). Handbook of Constraint Programming. Foundations of Artificial Intelligence series. Elsevier 2006.
2. E. Giunchiglia and T. Walsh (guest editors). SAT-2005: satisfiability research in the year 2005. *Journal of Automated Reasoning*, 25 (1-3), 2005. All the papers appear collected together in a Springer volume, ISBN: 1-4020-4552-2.
3. F. Bacchus and T. Walsh (editors). *Proceedings of Eighth International Conference on Theory and Applications of Satisfiability Testing (SAT-2005)*. Springer-Verlag Lecture Notes in Computer Science, Vol 3569, 2005.
4. G. Gottlob and T. Walsh (editors). *Proceedings of Eighteenth International Joint Conference on Artificial Intelligence (IJCAI-2003)*. Morgan Kaufmann, 2003.

5. T. Walsh (editor). *Proceedings of Seventh International Conference on Principles and Practice of Constraint Programming (CP-2001)*. Springer-Verlag Lecture Notes in Computer Science, Vol 2239, 2001.
6. B. Choueiry and T. Walsh (editors). *Abstraction, Reformulation, and Approximation: Proceedings of 4th International Symposium (SARA-2000)*. Springer-Verlag Lecture Notes in Computer Science, Vol 1864, 2000.
7. I.P. Gent and T. Walsh (guest editors). SAT-2000: satisfiability research in the year 2000. *Journal of Automated Reasoning*, 24 (1/2) and (4), 2000. All the papers appear collected together in Volume 63 of the Frontiers in Artificial Intelligence and Applications series of IOS Press, Amsterdam 2000.

Journals

8. C. Bessiere, K. Stergiou, and T. Walsh. Domain filtering consistencies for non-binary constraints. *Artificial Intelligence*, 172 (6-7), 2008.
9. C. Bessiere, E. Hebrard, B. Hnich, and T. Walsh. The Complexity of Global Constraints. *Constraints*, 12 (2), 2007.
10. C. Bessiere, E. Hebrard, B. Hnich, Z. Kiziltan and T. Walsh. Filtering algorithms for the NVALUE constraint. *Constraints*, 11 (4), 2006.
11. Y. Takenaga and T. Walsh. TETRAVEX is NP-complete. *Information Processing Letters*, 99 (5), 171-174, 2006.
12. A. Frisch, B. Hnich, Z. Kiziltan, I. Miguel and T. Walsh. Propagation algorithms for lexicographic ordering constraint. *Artificial Intelligence*, 170 (10), 803-908, 2006.
13. C. Domshlak, S. Prestwich, F. Rossi, K. B. Venable and T. Walsh. Hard and soft constraints for reasoning about qualitative conditional preferences. *Journal of Heuristics*, 12 (4-5), 263-285, 2006.
14. S.A. Tarim, S. Manandhar and T. Walsh. Stochastic Constraint Programming: A Scenario-Based Approach. *Constraints*, 11 (1), 53-81, 2006.
15. F. Rossi, K.B. Venable and T. Walsh. Aggregating preferences cannot be fair. *Intelligenza Artificiale*, 2 (1), 30-38, 2005.
16. B. Hnich, Z. Kiziltan and T. Walsh. Hybrid Modelling for Robust Solving. *Annals of Operations Research*, 130 (1-4), 19-39, 2004.
17. B. Hnich, B. Smith and T. Walsh. Dual Modelling of Permutation and Injection Problems. *Journal of Artificial Intelligence Research*, 21, 357-391, 2004.
18. F. Bacchus, X. Chen, P. van Beek and T. Walsh. Binary vs Non-Binary Constraints. *Artificial Intelligence*, 140 (1-2), 1-37, 2002.
19. I.P. Gent, E. MacIntyre, P. Prosser, B. Smith and T. Walsh. Random Constraint Satisfaction: Flaws and Structure. *Constraints*, 6 (4), 345-372, 2001.
20. I.P. Gent, K. Stergiou and T. Walsh. Decomposable Constraints. *Artificial Intelligence*, 123 (1-2), 133-156, 2000.

21. S. Colton, A. Bundy and T. Walsh. On the Notion of Interestingness in Automated Mathematical Discovery. *International Journal of Human-Computer Studies*, 53 (3), 351-375, 2000.
22. J. Frank, I.P. Gent and T. Walsh. Asymptotic and Finite Size Parameters for Phase Transitions: Hamiltonian Circuit as a Case Study. *Information Processing Letters*, 65 (5), 241-245, 1998.
23. I.P. Gent and T. Walsh. Analysis of Heuristic for Number Partitioning. *Computational Intelligence*, 14 (3), 430-451, 1998.
24. A. Bundy, F. Giunchiglia, A. Villafiorita and T. Walsh. Abstract proof checking: an example motivated by an incompleteness theorem. *Journal of Automated Reasoning*, 19 (3), 319-346, 1997.
25. A. Bundy, F. Giunchiglia, R. Sebastiani and T. Walsh. Calculating Criticalities. *Artificial Intelligence*, 88 (1-2), 39-67, 1996.
26. I.P. Gent and T. Walsh. The TSP Phase Transition. *Artificial Intelligence*, 88 (1-2), 349-358, 1996.
27. D. Basin and T. Walsh. A Calculus for and Termination of Rippling. *Journal of Automated Reasoning*. 16 (1-2), 147-180, 1996.
28. I.P. Gent and T. Walsh. The Satisfiability Constraint Gap. *Artificial Intelligence*, 81 (1-2), 1996.
29. T. Walsh. A Divergence Critic for Inductive Proof. *Journal of Artificial Intelligence Research*, 4, 209-235, 1996.
30. I.P. Gent and T. Walsh. Easy Problems are Sometimes Hard. *Artificial Intelligence*, 70, 335-345, 1994.
31. I.P. Gent and T. Walsh. An Empirical Analysis of Search in GSAT. *Journal of Artificial Intelligence Research*, 1, 25-37, 1993.
32. F. Giunchiglia and T. Walsh. The Inevitability of Inconsistent Abstract Spaces. *Journal of Automated Reasoning*, 11 (1), 23-42, 1993.
33. F. Giunchiglia and T. Walsh. A Theory of Abstraction. *Artificial Intelligence*, 56 (2-3), 323-390, 1992.

Refereed Conferences

34. C. Bessiere, E. Hebrard, B. Hnich, Z. Kiziltan, C.-G. Quimper and T. Walsh. Parameterized Complexity of Global Constraints. Proceedings of AAAI-2008, 2008.
35. C.-G. Quimper and T. Walsh. Decompositions of Grammar Constraints. Proceedings of AAAI-2008, 2008.
36. T. Walsh. Breaking Value Symmetry. Proceedings of AAAI-2008, 2008.
37. T. Walsh. Complexity of Terminating Preference Elicitation. Proceedings of AAMAS-2008, 2008.
38. S. Haim and T. Walsh. Online Estimation of SAT Solving Runtime. Proceedings of SAT-2008, 2008.

39. S. Brand, N. Narodytska, C.-G. Quimper, P. Stuckey and T. Walsh. Encodings of the SEQUENCE Constraint. Proceedings of CP-2007, 2007.
40. G. Katsirelos and T. Walsh. A Compression Algorithm for Large Arity Extensional Constraints. Proceedings of CP-2007, 2007.
41. Y.-C. Law, J. Lee, T. Walsh and J. Yip. Breaking symmetry of interchangeable variables and values. Proceedings of CP-2007, 2007.
42. C.-G. Quimper and T. Walsh. Decomposing Global Grammar Constraints. Proceedings of CP-2007, 2007.
43. T. Walsh. Breaking value symmetry. Proceedings of CP-2007, 2007.
44. T. Walsh. Uncertainty in preference elicitation and aggregation. Proceedings of AAAI-2007, 2007.
45. C. Bessiere, E. Hebrard, B. Hnich, Z. Kiziltan, C.-G. Quimper and T. Walsh. Reformulating global constraints: the SLIDE and REGULAR constraints. Proceedings of SARA-2007, 2007.
46. E. Hebrard, B. O'Sullivan and T. Walsh. Distance Constraints in Constraint Satisfaction. 20th International Joint Conference on Artificial Intelligence, (IJCAI-2007), India, 2007.
47. J. Lang, M. Pini, F. Rossi, K. Venable and T. Walsh. Winner Determination in Sequential Majority Voting. 20th International Joint Conference on Artificial Intelligence, (IJCAI-2007), India, 2007.
48. N. Narodytska and T. Walsh. Constraint and Variable Ordering Heuristics for Compiling Configuration Problems. 20th International Joint Conference on Artificial Intelligence, (IJCAI-2007), India, 2007.
49. M. Pini, F. Rossi, K. Venable and T. Walsh. Incompleteness and Incomparability in Preference Aggregation. 20th International Joint Conference on Artificial Intelligence, (IJCAI-2007), India, 2007.
50. T. Walsh. Symmetry Breaking. Proceedings of 19th Australian Joint Conference on Artificial Intelligence, (AI'06), 2006.
51. C. Bessiere, B. Hnich, E. Hebrard, Z. Kiziltan and T. Walsh. The ROOTS Constraint. Proceedings of the 12th International Conference on Principles and Practice of Constraint Programming, (CP-2006) 2006.
52. C.-G. Quimper and T. Walsh. Global Grammar Constraints. Proceedings of the 12th International Conference on Principles and Practice of Constraint Programming, (CP-2006) 2006.
53. T. Walsh. General Symmetry Breaking Constraints. Proceedings of the 12th International Conference on Principles and Practice of Constraint Programming, (CP-2006) 2006.
54. M.S. Pini, F. Rossi, B. Venable and T. Walsh. Computing possible and necessary winners from incomplete partially-ordered preferences. 17th European Conference on Artificial Intelligence, (ECAI-2006), Riva del Garda, 2006.
55. K. Stergiou and T. Walsh. Inverse Consistencies for Non-binary Constraints. 17th European Conference on Artificial Intelligence, (ECAI-2006), Riva del Garda, 2006.

56. T. Walsh. Symmetry Breaking using Value Precedence. 17th European Conference on Artificial Intelligence, (ECAI-2006), Riva del Garda, 2006.
57. P. Kilby, J. Slaney, S. Thiebaux and T. Walsh. Estimating Search Tree Size. 21st National Conference on Artificial Intelligence, (AAAI-2006), Boston, 2006.
58. C. Bessiere, B. Hnich, E. Hebrard, Z. Kiziltan and T. Walsh. The Range Constraint: Algorithms and Implementation. Proceedings of 6th International Conference on Integration of AI and OR techniques in Constraint Programming for Combinatorial Optimisation Problems (CP-AI-OR'06), LNCS 3990, 59-73, 2006.
59. C.-G. Quimper and T. Walsh. The All Different and Global Cardinality Constraints on Set, Multiset and Tuple Variables. Recent Advances in Constraints: Joint ERCIM/CoLogNET International Workshop on Constraint Solving and Constraint Logic Programming, 1-13, LNCS 3978, 2006.
60. C. Bessiere, B. Hnich, E. Hebrard, Z. Kiziltan and T. Walsh. Among, Common and Disjoint Constraint. Recent Advances in Constraints: Joint ERCIM/CoLogNET International Workshop on Constraint Solving and Constraint Logic Programming, 29-43, LNCS 3978, 2006.
61. C.-G. Quimper and T. Walsh. Beyond Finite Domains: the All Different and Global Cardinality Constraints. Proceedings of the 11th International Conference on Principles and Practice of Constraint Programming, (CP-2005) 812-816, 2005.
62. E. Hebrard, B. Hnich, B. O'Sullivan and T. Walsh. Finding Diverse and Similar Solutions in Constraint Programming. 20th National Conference on Artificial Intelligence, (AAAI-2005), Pittsburgh, 2005.
63. S. Prestwich, F. Rossi, B. Venable and T. Walsh. Constraint-based Preferential Optimization. 20th National Conference on Artificial Intelligence, (AAAI-2005), Pittsburgh, 2005.
64. P. Kilby, J. Slaney, S. Thiebaux and T. Walsh. Backbones and Backdoors in Satisfiability. 20th National Conference on Artificial Intelligence, (AAAI-2005), Pittsburgh, 2005.
65. F. Bacchus and T. Walsh. Propagation Logical Combinations of Constraints. 19th International Joint Conference on Artificial Intelligence, (IJCAI-2005), Edinburgh, 2005.
66. C. Bessiere, B. Hnich, E. Hebrard, Z. Kiziltan and T. Walsh. Counting and Occurrence Constraints. 19th International Joint Conference on Artificial Intelligence, (IJCAI-2005), Edinburgh, 2005.
67. P. Kilby, J. Slaney and T. Walsh. The Travelling Salesperson Backbone. 19th International Joint Conference on Artificial Intelligence, (IJCAI-2005), Edinburgh, 2005.
68. A.M. Frisch, B. Hnich, I. Miguel, B.M. Smith and T. Walsh. Transforming and Refining Abstract Constraint Specifications. Proceedings of 6th International Symposium on Abstraction, Reformulation and Approximation (SARA 2005), pp. 76-91, ed. J.-D. Zucker and L. Saitta, LNCS 3607, 2005.
69. M.S. Pini, F. Rossi, B. Venable and T. Walsh. Aggregating partially ordered preferences: impossibility and possibility results. Proceedings of 10th Conference Theoretical Aspects of Rationality and Knowledge (TARK-2005), Singapore, 2005.

70. C. Bessiere, E. Hebrard, B. Hnich, Z. Kiziltan and T. Walsh. Filtering Algorithms for the NVALUE constraint. 5th International Conference on Integration of AI and OR techniques in Constraint Programming for Combinatorial Optimisation Problems (CP-AI-OR'05), Prague, 2005.
71. C. Bessiere, E. Hebrard, B. Hnich and T. Walsh. Disjoint, Partition and Intersection Constraints for Set and Multiset Variables. 10th International Conference on Principles and Practice of Constraint Programming (CP-2004), Toronto, 2004.
72. C. Bessiere, E. Hebrard, B. Hnich and T. Walsh. The Tractability of Global Constraints. 10th International Conference on Principles and Practice of Constraint Programming (CP-2004), Toronto, 2004.
73. C. Thiffault, F. Bacchus and Toby Walsh. Solving Non-Clausal Formulas with DPLL search. 10th International Conference on Principles and Practice of Constraint Programming (CP-2004), Toronto, 2004.
74. E. Hebrard, B. Hnich and T. Walsh. Robust Solutions for Constraint Satisfaction and Optimization. 16th European Conference on Artificial Intelligence, (ECAI-2004), Valencia, 2004.
75. C. Bessiere, E. Hebrard, B. Hnich and T. Walsh. The Complexity of Global Constraints. 19th National Conference on Artificial Intelligence, (AAAI-2004), San Jose, 2004.
76. F. Rossi, B. Venable and T. Walsh. mCP-nets: representing and reasoning with preferences of multiple agents. 19th National Conference on Artificial Intelligence, (AAAI-2004), San Jose, 2004.
77. C. Thiffault, F. Bacchus and Toby Walsh. Solving Non-Clausal Formulas with DPLL search. 7th International Symposium on the Theory and Applications of Satisfiability Testing (SAT-2004), Vancouver, 2004.
78. E. Hebrard, B. Hnich and T. Walsh. Super Solutions in Constraint Programming. 4th International Conference on Integration of AI and OR techniques in Constraint Programming for Combinatorial Optimisation Problems (CP-AI-OR'04), Nice, France, 2004.
79. B. Hnich, Z. Kiziltan and T. Walsh. Combining Symmetry Breaking with Order Constraints: lexicographical ordering with sums. 8th International Symposium on AI and Maths, Ft. Lauderdale, 2004.
80. T. Walsh. Constraint Patterns. 9th International Conference on Principles and Practice of Constraint Programming (CP-2003), Kinsale, 2003.
81. T. Walsh. Consistency and Propagation with Multiset Constraints: A Formal Viewpoint. 9th International Conference on Principles and Practice of Constraint Programming (CP-2003), Kinsale, 2003.
82. C. Domshlak, F. Rossi, B. Venable and T. Walsh. Reasoning about soft constraints and conditional preferences: complexity results and approximation techniques. 18th International Joint Conference on Artificial Intelligence, (IJCAI-2003), Acapulco, 2003.
83. A. Frisch, B. Hnich, Z. Kiziltan, I. Miguel and T. Walsh. Multiset Ordering Constraints. 18th International Joint Conference on Artificial Intelligence, (IJCAI-2003), Acapulco, 2003.

84. S. Manandahr, A Tarim and T. Walsh. Scenario-based Stochastic Constraint Programming. 18th International Joint Conference on Artificial Intelligence, (IJCAI-2003), Acapulco, 2003.
85. C. Bessiere, E. Hebrard and T. Walsh. Local consistencies in SAT. 6th International Symposium on the Theory and Applications of Satisfiability Testing (SAT-2003), Portofino, 2003.
86. P. Flener, A. Frisch, B. Hnich, Z. Kiziltan, I. Miguel, J. Pearson and T. Walsh. Breaking Row and Column Symmetries in Matrix Models. 8th International Conference on Principles and Practice of Constraint Programming (CP-2002), Cornell, 2002.
87. A. Frisch, B. Hnich, Z. Kiziltan, I. Miguel and T. Walsh. Global Constraints for Lexicographic Orderings. 8th International Conference on Principles and Practice of Constraint Programming (CP-2002), Cornell, 2002.
88. T. Walsh. Stochastic Constraint Programming. 15th European Conference on Artificial Intelligence, (ECAI-2002), Lyons, 2002.
89. T. Walsh. The Interface between P and NP: COL, XOR, NAE, 1-in-k and Horn SAT. 18th National Conference on Artificial Intelligence, (AAAI-2002), Edmonton, 2002.
90. A. Frisch, D. Sheridan and T. Walsh. A Fixpoint Based Encoding for Bounded Model Checking. 4th International Conference on Formal Methods in Computer-Aided Design (FMCAD 2002), 2002.
91. L. Drake, A. Frisch and T. Walsh. Adding resolution to the DPLL procedure for satisfiability. 5th International Symposium on the Theory and Applications of Satisfiability Testing (SAT-2002), Cincinnati, 2002.
92. J. Slaney and T. Walsh. Phase transition behavior: from decision to optimization. 5th International Symposium on the Theory and Applications of Satisfiability Testing (SAT-2002), Cincinnati, 2002.
93. B. Hnich, Z. Kiziltan and T. Walsh. Modelling a balanced academice curriculum problem. 4th International Conference on Integration of AI and OR techniques in Constraint Programming for Combinatorial Optimisation Problems (CP-AI-OR'02), Le Croisic, France, 2002.
94. T. Walsh. Permutation Problems and Channelling Constraints. 8th International Conference on Logic for Programming, Artificial Intelligence and Reasoning, (LPAR-2001), Havana, Cuba, 2001.
95. J. Slaney and T. Walsh. Backbones in Optimization and Approximation. 17th International Joint Conference on Artificial Intelligence, (IJCAI-2001), Seattle, 2001.
96. T. Walsh. Search on High Degree Graphs. 17th International Joint Conference on Artificial Intelligence, (IJCAI-2001), Seattle, 2001.
97. P. Prosser, K. Stergiou and T. Walsh. Singleton Consistencies. 6th International Conference on Principles and Practice of Constraint Programming, (CP-2000), Singapore, 2000.
98. T. Walsh. SAT v CSP. 6th International Conference on Principles and Practice of Constraint Programming, (CP-2000), Singapore, 2000.

99. S. Colton, A. Bundy and T. Walsh. Automatic Invention of Integer Sequences. 17th National Conference on Artificial Intelligence, (AAAI-2000), Austin, 2000.
100. B. Smith, K. Stergiou and T. Walsh. Using auxiliary variables and implied constraints to model non-binary problems. 17th National Conference on Artificial Intelligence, (AAAI-2000), Austin, 2000.
101. S. Colton, A. Bundy and T. Walsh. Automatic Identification of Mathematical Concepts. 17th International Conference on Machine Learning, (ICML-2000), Stanford, 2000.
102. T. Walsh. Reformulating propositional satisfiability as constraint satisfaction. 3rd Symposium on Abstraction, Reformulation and Approximation, (SARA-2000), Austin, 2000.
103. K. Stergiou and T. Walsh. Decomposable constraints. Proceedings of ERCIM/Compulog-Net Workshop, Springer-Verlag LNCS, 2000.
104. I.P. Gent and T. Walsh. CSPLib: a benchmark library for constraints. 5th International Conference on Principles and Practice of Constraint Programming, (CP-99), Alexandria, Virginia, 1999.
105. S. Colton, A. Bundy and T. Walsh. Automatic Concept Formation in Pure Mathematics. 16th International Joint Conference on Artificial Intelligence, (IJCAI-99), Stockholm, 1999.
106. K. Stergiou and T. Walsh. The Difference All-Difference Makes. 16th International Joint Conference on Artificial Intelligence, (IJCAI-99), Stockholm, 1999.
107. T. Walsh. Search in a Small World. 16th International Joint Conference on Artificial Intelligence, (IJCAI-99), Stockholm, 1999.
108. I.P. Gent, H. Hoos, P. Prosser and T. Walsh. Morphing: combining structure and randomness. 16th National Conference on Artificial Intelligence, (AAAI-99), Orlando, 1999.
109. I.P. Gent and T. Walsh. Beyond NP: the QSAT phase transition. 16th National Conference on Artificial Intelligence, (AAAI-99), Orlando, 1999.
110. K. Stergiou and T. Walsh. Encodings of non-binary constraint satisfaction problems. 16th National Conference on Artificial Intelligence, (AAAI-99), Orlando, 1999.
111. E. MacIntyre, P. Prosser, B. Smith and T. Walsh. Random Constraint Satisfaction: Theory meets Practice. 4th International Conference on Principles and Practice of Constraint Programming, (CP-98), Pisa, Italy, 1998.
112. P. Meseguer and T. Walsh. Interleaved and Discrepancy Based Search. 13th European Conference on Artificial Intelligence, (ECAI-98), Brighton, 1998.
113. T. Walsh. The Constrainedness Knife-Edge. 15th National Conference on Artificial Intelligence, (AAAI-98), Madison, 1998.
114. I.P. Gent, E. MacIntyre, P. Prosser, P. Shaw and T. Walsh. The Constrainedness of Arc Consistency. 3rd International Conference on Principles and Practice of Constraint Programming, (CP-97), Schloss Hagenberg, Austria, 1997.

115. I.P. Gent and T. Walsh. From Approximate to Optimal Solutions: Constructing Pruning and Propagation Rules. 15th International Joint Conference on Artificial Intelligence, (IJCAI-97), Nagoya, Japan, 1997.
116. T. Walsh. Depth-bounded Discrepancy Search. 15th International Joint Conference on Artificial Intelligence, (IJCAI-97), Nagoya, Japan, 1997.
117. I.P. Gent, E. MacIntyre, P. Prosser, and T. Walsh. The Scaling of Search Cost. 14th National Conference on Artificial Intelligence, (AAAI-97), Providence, 1997.
118. D. Clark, J. Frank, I.P. Gent, E. MacIntyre, N. Tomov and T. Walsh. Local Search and the Number of Solutions. 2nd International Conference on Principles and Practice of Constraint Programming, (CP-96), Cambridge, Massachusetts, 1996.
119. I.P. Gent, E. MacIntyre, P. Prosser, B. Smith and T. Walsh. An Empirical Study of Dynamic Variable Ordering Heuristics for the Constraint Satisfaction Problem. 2nd International Conference on Principles and Practice of Constraint Programming, (CP-96), Cambridge, Massachusetts, 1996.
120. I.P. Gent and T. Walsh. Phase Transitions and Annealed Theories: Number Partitioning as a Case Study. 12th European Conference on Artificial Intelligence, (ECAI-96), Budapest, 1996.
121. A. Bundy, F. Giunchiglia, R. Sebastiani and T. Walsh. Computing Abstraction Hierarchies by Numerical Simulation. 13th National Conference on Artificial Intelligence, (AAAI-96), Portland, 1996.
122. I.P. Gent, E. MacIntyre, P. Prosser and T. Walsh. The Constrainedness of Search. 13th National Conference on Artificial Intelligence, (AAAI-96), Portland, 1996.
123. F. Giunchiglia, R. Sebastiani, A. Villafiorita, and T. Walsh. A General Purpose Reasoner with Abstraction. Canadian Artificial Intelligence Conference, Toronto, 1996.
124. I.P. Gent, E. MacIntyre, P. Prosser and T. Walsh. Scaling Effects in the CSP Phase Transition. International Conference on Principles and Practice of Constraint Programming, (CP-95), Cassis, France, 1995.
125. I.P. Gent and T. Walsh. Computational Phase Transitions from Real Problems. 8th International Symposium on Artificial Intelligence, (ISAI-95), Monterey, Mexico, 1995.
126. I.P. Gent and T. Walsh. Unsatisfied Variables in Local Search. In *Hybrid Problems, Hybrid Solutions* (AISB-95), editor J. Hallam, IOS Press, Amsterdam, 1995.
127. D. Basin and T. Walsh. A Calculus for Rippling. 4th International Conference on Conditional and Typed Rewriting Systems, (CTRS-94), Jerusalem, 1994.
128. I.P. Gent and T. Walsh. The SAT Phase Transition. 11th European Conference on Artificial Intelligence, (ECAI-94), Amsterdam, 1994.
129. T. Yoshida, A. Bundy, I. Green, T. Walsh and D. Basin. Coloured rippling: An extension of a theorem proving heuristic. 11th European Conference on Artificial Intelligence, (ECAI-94), Amsterdam, 1994.
130. D. Basin and T. Walsh. Termination Orderings for Rippling. 12th International Conference on Automated Deduction, (CADE-12), Nancy, France, 1994.

131. T. Walsh. A Divergence Critic. 12th International Conference on Automated Deduction, (CADE-12), Nancy, France, 1994.
132. I.P. Gent and T. Walsh. The Hardest Random SAT Problems. German Conference on Artificial Intelligence, (KI-94), Saarbrücken, Germany, 1994.
133. D. Basin and T. Walsh. Difference Unification. 13th International Joint Conference on Artificial Intelligence, (IJCAI-93), Chambéry, France, 1993.
134. I.P. Gent and T. Walsh. Towards an Understanding of Hill-climbing Procedures for SAT. 11th National Conference on Artificial Intelligence, (AAAI-93), Washington, 1993.
135. T. Walsh. General Purpose Proof Plans. 3rd International Symposium on Design and Implementation of Symbolic Computation Systems, (DISCO-93), Gmunden, Austria, 1993.
136. F. Giunchiglia and T. Walsh. Tree Subsumption: Reasoning with Outlines. 10th European Conference on Artificial Intelligence, (ECAI-92), Vienna, 1992.
137. D. Basin and T. Walsh. Difference Matching. 11th International Conference on Automated Deduction, (CADE-11), Albany, New York, 1992.
138. A. Bundy, A. Nunes and T. Walsh. The Use of Proof Plans to Sum Series. 11th International Conference on Automated Deduction, (CADE-11), Albany, New York, 1992.
139. F. Giunchiglia and T. Walsh. An Abstract Proof Checker. 2nd International Symposium on Artificial Intelligence and Maths, Fort Lauderdale, 1992.
140. F. Giunchiglia and T. Walsh. Using Abstractions. 8th Conference of the Society for the Study of Artificial Intelligence and Simulation of Behaviour, (AISB-91), Leeds, 1991.
141. F. Giunchiglia and T. Walsh. The use of Abstraction in Automatic Inference. UK Conference on Information Technology, (IT-90), Southampton, 1990.
142. F. Giunchiglia and T. Walsh. Abstract Theorem Proving. 11th International Joint Conference on Artificial Intelligence, (IJCAI-89), Detroit, 1989.
143. F. Giunchiglia and T. Walsh. Theorem Proving with Definitions. 7th Conference of the Society for the Study of Artificial Intelligence and Simulation of Behaviour, (AISB-89), Brighton, 1989.
144. F. Giunchiglia and T. Walsh. Inconsistent Abstractions. 1st Italian Conference on Artificial Intelligence, (AI*IA-89), Trento, Italy, 1989.
145. T. Walsh. PLATO. 5th International Conference on Technology in Education, Edinburgh, 1988.

Theses

146. T. Walsh. A Theory of Abstraction. PhD thesis, Dept. of Artificial Intelligence, Edinburgh University, 1991.
147. T. Walsh. PLATO: Predicate Logic Advisory TOol. MSc thesis (published), Dept. of Artificial Intelligence, Edinburgh University, 1987.

Book chapters

148. T. Walsh. Analogical Proof Planning. In T. Dartnall (editor), *Artificial Intelligence and Creativity*, Kluwer, 1994.

Workshops, Lectures, Committees

- Editor-in-Chief of the Journal of Artificial Intelligence Research.
- Editor-in-Chief of AI Communications (retired).
- Editorial Board of Journal of Automated Reasoning, the Constraints journal and Logical Methods in Computer Science.
- Editorial Board of the ECCAI PhD thesis series, IOS Press.
- Editor of special issues of Journal of Automated Reasoning on satisfiability, Volume 24, Numbers 1-2 and 4, 2000 and Volume 25, Number 1-3, 2005.
- Elected trustee of the Conference on Automated Deduction (2002-date).
- Elected member of the Association of Constraint Programming (2003-date). Secretary of this Association. Editor of CP news.
- Program Chair of IJCAI-2011 (22nd International Joint Conference on Artificial Intelligence).
- Conference Chair of CP-2008 (12th International Conference on Principles and Practice of Constraint Programming),
- Chair of SAT-2005 (8th International Symposium on the Theory and Applications of Satisfiability Testing).
- Conference Chair of IJCAR-2004 (2nd International Joint Conference on Automated Reasoning).
- Program Chair of CP-2001 (7th International Conference on Principles and Practice of Constraint Programming), AAAI Fall 2001 Symposium on Using Uncertainty within Computation, and SARA-2000 (3rd Symposium on Abstraction, Reformulation and Approximation).
- Poster Chair of IJCAI-2003 (18th International Joint Conference on Artificial Intelligence).
- Workshop Chair of ECAI-2006 (17th European Conference on Artificial Intelligence).
- Tutorial Chair of IJCAR 2001 (International Joint Conference on Automated Reasoning).
- Workshop and Tutorial Chair of CP-2000 (6th International Conference on Principles and Practice of Constraint Programming).
- Invited speaker at AAAI 2007 (22nd National Conference on Artificial Intelligence), AI'06 (19th Australian Joint Conference on Artificial Intelligence), MICAI-2004 (3rd Mexican International Conference on Artificial Intelligence), 2nd Workshop on Pragmatics of Decision Procedures in Automated Reasoning (PDPAR 2004), IJCAR 2004

Workshop on Disproving, the 9th International Conference on Principles and Practice of Constraint Programming (CP-2003), the 6th International Symposium on the Theory and Applications of Satisfiability Testing (SAT-2003), Workshop on the Propositional Satisfiability Problem (Schloss Dagstuhl 2003), the Australasian Workshop on Computational Logic (AWCL-2002), the Topical Conference on “Typical-case complexity, Randomness and Analysis of Search Algorithms” (International Centre for Theoretical Physics, Trieste 2002), the 13th International Workshop on Principles of Diagnosis (DX-02, Grand Hotel Panhans, Semmering, Austria 2002), the Topical Conference on NP-hardness and Phase Transitions (International Centre for Theoretical Physics, Trieste 1999), the DARPA Workshop on Real-time and Dynamic Behavior of Autonomous Negotiating Teams (Arlington, Virginia 1999), the Workshop on Interfaces between Statistical Physics and Computer Science (Institute for Scientific Interchange, Turin 1998), the Workshop on Advances in Informatics (Innsbruck 1996), and the National Conference on the Solution of NP-complete problems (Dijon 1996),

- Senior programme committee of IJCAI-2009 (21st International Joint Conference on Artificial Intelligence), AI’08 (21st Australasian Joint Conference on Artificial Intelligence), AAAI-2008 (23rd National Conference on Artificial Intelligence), AAAI-2007 (22nd National Conference on Artificial Intelligence), AI’06 (19th Australian Joint Conference on Artificial Intelligence), IJCAI-2005 (19th International Joint Conference on Artificial Intelligence).
- Programme committee of ADT-2009, IJCAI-2009, SARA-2009, SAT-2009, AI’08, AAAI-2008, AAMAS-2008, AI & Maths-2008, AIMSA-2008, ICAI-2008, IJCAR-2008, JELIA-2008, PRICAI-2008, RAC-2008, SAT-2008, SBIA-2008, STAIR-2008, AI’07, AAAI-2007, ASCM-2007, CADE-21, CAEPIA-2007, CP-2007, IJCAI-2007, LPAR-2007, MICAI-2007, SARA-2007, SAT-2007, AI’06, AAAI-2006, AI & Maths-2006, CG’2006, CP-2006, ECAI-2006, ICAPS-2006, JELIA-2006, KR-2006, MICAI-2006, PRICAI-2006, SAT-2006, AAAI-2005, AI’05, CADE-20, CP-2005, ICAPS-2005, IJCAI-2005, KI-05, MICAI-2005, SARA-2005, AI’04, AAAI-2004, AI & Maths-2004, IBERAMIA-2004, JELIA-2004, KI-04, KR-2004, LPAR-2004, MICAI-2004, SAT 2004, AI’03, CADE-19, CP-2003, CP-AI-OR’03, LPAR-2003, SAT 2003, AAAI-2002, AI’02, CADE-18, ECAI-2002, KR-2002, MICAI-2002, SARA-2002, SAT 2002, Calculemus 2001, ICLP-2001, SAGA-2001, SAT 2001, AAAI-2000, CL-2000, CP-AI-OR’00, ECAI-2000, KR-2000, MICAI-2000, IJCAI-99, CP-99, AAAI-98, AI’98, AIMSA-98, SARA-98, ECP-97, AAAI-96, and SARA-95.
- Chair of 2006 Workshop of the NICTA Technical Focus Group on Optimization, ICAPS 2005 Workshop on Constraint Programming for Planning and Scheduling, ECAI-2004 Workshop on Modelling and Solving Problems with Constraints, AAAI-2002 Workshop on Probabilistic Approaches in Search, ECAI-2002 Workshop on Modelling and Solving Problems with Constraints, QBF-02 (2nd International Workshop on Quantified Boolean Formulae), ARW-02 (9th Workshop on Automated Reasoning), ConsNet-99 (inaugural meeting of UK Constraints Network), Workshops on Empirical AI (ECAI-98, IJCAI-97 and ECAI-96), CIAO-99 workshop and Workshop on Automation of Proof by Mathematical Induction (CADE-12).
- Organizing committee of ICAPS-2008 Doctoral Programme, CP-2007 Doctoral Pro-

gramme, CP-2006 Doctoral Programme, CP-2005 Doctoral Programme, CP-2004 Doctoral Programme, CP-2003 Doctoral Programme, CP-2002 Doctoral Programme, and CP-2001 Doctoral Programme.

- Founder of CSPLib, a benchmark library for constraints (<http://www.csplib.org>).
- EPSRC Peer Review College member, 2000-date.
- IEE Professional Group Committee member (Artificial Intelligence).
- Responsible for preparation of Third Edition of Catalogue of AI Tools, published by Springer-Verlag (editor Alan Bundy).
- International referee for the Italian Ministry for Education University and Research, the Canadian National Science and Engineering Research Council, and the United States-Israel Binational Science Foundation.
- Referee for numerous conferences including IJCAI, AAI, ECAI, CADE and CP. Voted as one of the “outstanding reviewers” for IJCAI-97.
- Referee for the journal Artificial Intelligence, the Journal of Automated Reasoning, the Journal of Artificial Intelligence Research, New Generation Computing and Theoretical Computer Science.
- Departmental Seminar organizer from 1990 to 1992.
- Invited lectures at AT&T (Bell Labs), SRI (Stanford), NEC Research (Princeton), Xerox (Menlo Park), MPI (Saarbrücken), IRST (Trento), INRIA (Nancy), GMD (Bonn), DFKI (Saarbrücken).

Teaching Experience

- Supervisor for Shai Haim (PhD student, 2006-date), Nina Narodytska (PhD student, 2006-date), Emmanuel Hebrard (PhD student, “Robust Solutions for Constraint Satisfaction and Optimisation under Uncertainty”, 2002-2006), Lyndon Drake (PhD student, 2000-2005), Dan Sheridan (PhD student, “Temporal Logic Encodings for SAT-based Bounded Model Checking”, 2000-2006), Zeynep Kiziltan (PhD student, “Symmetry breaking ordering constraints”, 1999-2003), Brahim Hnich (PhD student, “Function variables for constraint programming”, 1999-2003), Kostas Stergiou (PhD student, “Representation and Reasoning with Non-binary constraints”, 1997-2001), Simon Colton (PhD student, “Machine discovery of mathematical concepts”, 1996-2000, Conference of Professors and Heads of Computing/British Computer Science Distinguished Dissertation in Computer Science), Renato Busatto-Neto (PhD, “The Use of Proof Planning in Normalisation”, 1992-1995), Graham Steel (MSc student, “Cross-Domain Concept Formation using HR”, 1999), Nicholas Free (MSc, “Summing Series Using Proof Plans”, 1992), Alex Nunes (MSc, “Summing Series Using Proof Plans”, 1991).
- Habilitation committee for Brahim Hnich (University of Montpellier, January 2008). and Eric Monfroy (University of Nantes, November 2002).

- External PhD examiner for Tarik Hadzic (IT-University of Copenhagen, 2007), Fabrice Nahon (LORIA, Nancy, 2007), Lionel Paris (University of Marseille 2007), Yong Gao (University of Alberta, July 2005); Ines Lynce, (Instituto Superior T´cnico, February 2005), Bernard Jurkowiak, (Universite de Picardie, October 2004), Neil Yorke-Smith (IC-Parc, June 2004), Santiago Macho-Gonzalez (EPFL, March 2004), Lucas Bordeaux (University of Nantes, September 2003), Andrew Slater (Australia National University, December 2002), John Thornton (Griffith University, April 2000), Christian Frei (EPFL, March 2000, ECCAI Artificial Intelligence Dissertation Award), Xinguang Chen (University of Alberta, February 2000).
- Organizer of 2nd International Summer School of the Association for Constraint Programming, 2006.
- Invited lecturer for the Distinguished Lecture Series at the School of Computer Science, University of St Andrews, 2003.
- Invited lecturer for a graduate course on “Propositional Satisfiability” at the 12th Annual Logic and Automated Reasoning Summer School held at ANU, Canberra, Australia, December 2003.
- Invited lecturer for a graduate course on “Constraints and Search” at the 11th Annual Logic and Automated Reasoning Summer School held at ANU, Canberra, Australia, December 2002.
- Invited lecturer for a graduate course on “Modelling and non-binary constraints” at the University of Padova, April 2002.
- Invited lecturer for a graduate course on “Automated Reasoning” at the 10th Annual Logic Summer School held at ANU, Canberra, Australia, December 2001.
- Invited lecturer for a graduate course on “Resolution and Unification” at the 9th Annual Logic Summer School held at ANU, Canberra, Australia, December 2000.
- Invited lecturer for a graduate course on “Propositional reasoning” at the 7th Annual Logic Summer School held at ANU, Canberra, Australia, January 1999.
- Invited tutorial on “How to write a paper”, Doctoral Symposium of the 11th International Conference on Principles and Practice of Constraint Programming, (CP-2005), Sitges, 2005.
- Invited tutorial on “How to manage your supervisor”, Doctoral Symposium of the 10th International Conference on Principles and Practice of Constraint Programming, (CP-2004), Toronto, 2004.
- Invited tutorial on “How to write a PhD thesis”, Doctoral Programme of the 2nd International Joint Conference on Automated Reasoning, (IJCAR-2004), Cork, 2004.
- Invited tutorial on “How to write a PhD thesis”, Doctoral Symposium of the 9th International Conference on Principles and Practice of Constraint Programming, (CP-2003), Kinsale, 2003.
- Invited tutorial on “Ethical Constraints”, Doctoral Symposium of the 8th International Conference on Principles and Practice of Constraint Programming, (CP-2002), Cornell, 2002.

- Invited tutorial on “Reviewing Papers”, Doctoral Symposium of the 7th International Conference on Principles and Practice of Constraint Programming, (CP-2001), Cyprus, 2001.
- Tutorial on “Phase Transitions and Structure in Combinatorial Problems”, 18th National Conference on Artificial Intelligence (AAAI-2002), Edmonton, Canada, 2002.
- Tutorial on “Empirical Methods for Artificial Intelligence and Computer Science”, 17th International Joint Conference on Artificial Intelligence (IJCAI-2001), Seattle, 2001.
- Tutorial on “Phase Transitions and Structure in Combinatorial Problems”, 17th International Joint Conference on Artificial Intelligence (IJCAI-2001), Seattle, 2001.
- Tutorial on “Empirical Methods for Artificial Intelligence and Computer Science”, 17th National Conference on Artificial Intelligence (AAAI-2000), Austin, Texas, 2000.
- Tutorial on “Empirical Methods for Artificial Intelligence and Computer Science”, 14th European Conference on Artificial Intelligence (ECAI-200), Berlin, 2000.
- Invited tutorial on “Phase Transition Behaviour”, 1st International Conference on Computational Logic (CL-2000), London, 2000.
- Tutorial on “Satisfiability” at 16th International Joint Conference on Artificial Intelligence (IJCAI-99), Stockholm, 1999.
- Tutor for MSc courses in Lisp, Prolog, Knowledge Representation and Inference, and Automated Reasoning (Dept of AI, Edinburgh).
- Tutor for undergraduate courses in Lisp (Dept of AI, Edinburgh).
- Tutor for undergraduate courses in Logic (Dept of Philosophy, Edinburgh).
- Guest lecturer on Constraint Satisfaction course (Dept of CS, University of York).
- Guest lecturer on Computer Science Literature course (Dept of CS, University of Strathclyde).
- Demonstrator for Knowledge Representation, Planning and Search, Lisp and Prolog courses (Dept of AI, Edinburgh).
- Demonstrator for undergraduate courses in Scheme (Dept of CS, University of Strathclyde).
- Demonstrator for Undergraduate Open Days (Dept of AI, Edinburgh).
- Postgraduate member of Teaching and Library Committees (Dept of AI, Edinburgh).

Industrial Experience

Jan 1983-Jun 1983, Research assistant at Hirst (GEC) Research, London.
 Jun 1983-Sep 1983, Computing tutor at Cedar Lake Camp, PA, USA.
 Jun 1984-Sep 1984, Computer programmer at Robocom Ltd, London.
 Jul 1986-Aug 1986, Computer programmer at Principia Mechanica, London.

Referees

Prof. Bart Selman, Department of Computer Science, Cornell University, USA.

Email: selman@cs.cornell.edu. Tel: +1 607-255-5638. Fax: +1 607-255-4428.

Prof. Peter van Beek, School of Computer Science, University of Waterloo, Canada.

Email: vanbeek@uwaterloo.ca. Tel: +1 519 888-4567, x5344. Fax: +1 519 885-1208.

Prof. Alan Bundy, School of Informatics, Edinburgh University, Scotland.

Email: A.Bundy@ed.ac.uk. Tel: +44 131 650 2745. Fax: +44 131 650 6513.

The relationships between education and employment are determined not only by the function of education to prepare learning for subsequent work tasks and other life learning. The levels and the types of education, however, never are closely "matched" to professional positions and job requirements. Imperfections are unavoidable, because individuals have to be trained to cope with imperfections and to be able to change employment and work themselves proactively. Thus was laid the groundwork for contemporary vocational education and the perceived relationship between education and employment. Does More Education Always Lead To A Better Job? Similarly, research on type of education (i.e., vocational, college prep) shows some of the expected relationships to employment, wages, and so forth. What Skills And Attitudes Do Future Workers Need To Learn? Basic Skills. Education and employment are locked together, giving us the opportunity to learn and grow, until we reach our potential. 16.3K views · View upvotes. Education is essential so as to excel in employment and the success in any company is determined by the higher grades in education and academic career. It is best to start the career at the best company and Piterion in Germany is a good place to join for the work culture and the learning possibilities.