Jessica Davies

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Areas of Research Experience

Combinatorial search and optimization, integer programming, constraint programming, model counting, computational social choice, hardware verification.

Education

Ph.D. Computer Science, University of Toronto, 2013.

Supervisor: Fahiem Bacchus

Committee: Sheila McIlraith, Toniann Pitassi

Thesis: Solving MAXSAT by Decoupling Optimization and Satisfaction

M.Sc. Computer Science, University of Toronto, 2007.

Supervisor: Fahiem Bacchus

Thesis: Using More Reasoning to Improve #SAT Solving

Hon. B.Sc. Computer Science, University of Toronto, 2005.

Programs: Specialist in Computer Science, and Specialist in Mathematics and its Applications

GPA: 3.97 out of 4.0

Honors and Awards

AAAI 2011 Outstanding Paper Award for "Complexity of and Algorithms for Borda Manipulation"

National Sciences and Engineering Research Council of Canada (NSERC) Michael Smith Foreign Study Supplement, 2010 ($6000)

NSERC Alexander Graham Bell Canada Graduate Scholarship, 2007–2010 ($35000/year)

NSERC Postgraduate Scholarship, 2006–2007 ($17300)

Internships

Visiting Researcher, NICTA, Sydney, Australia, February–May 2010 and November 2011.

Supervisor: Toby Walsh

Employment

Software Developer, Granata Decision Systems, Toronto, Ontario, October 2013–March 2014.

Developed software for marketing campaign optimization

Researcher, Institut National de la Recherche Agronomique, Toulouse, France, June–July 2013.

Investigated algorithmic approaches for protein design

Tutorial Assistant, University of Toronto, 2005 – 2011.

Prepared and presented tutorial lectures, marked assignments and exams

Consultant, Thermo Fisher Scientific, Burlington, Ontario, August 2010.

Developed software for laboratory automation

Software Developer, Twisted Melon Inc., Toronto, Ontario, 2006–2007.

Mac OS X driver and GUI development for an infrared remote control

Software Developer, ATI Technologies Inc., Markham, Ontario, 2003–2004.

Mac OS X driver and GUI development, graphics chip testing

Office Clerk, Ontario Rental Housing Tribunal, London, Ontario, 2002.

Editorial Assistant, Bade Editorial Management Services, London, Ontario, 2002.

Lifeguard, London, Ontario, summers 1999-2001.

Research

Journal Papers

David Allouche, Isabelle André, Sophie Barbe, Jessica Davies, Simon de Givry, George Katsirelos, Barry O'Sullivan, Steve Prestwich, Thomas Schiex, Seydou Traoré. Computational Protein Design as an Optimization Problem. Artificial Intelligence. To appear.

Jessica Davies, George Katsirelos, Nina Narodystka, Toby Walsh, and Lirong Xia. Complexity of and Algorithms for the Manipulation of Borda, Nanson and Baldwins Voting Rules. Artificial Intelligence. To appear.

Jocelyn Simmonds, Jessica Davies, Arie Gurfinkel, and Marsha Chechik. Exploiting Resolution Proofs to Speed Up LTL Vacuity Detection for BMC. International Journal on Software Tools for Technology Transfer (STTT). 12(5), p.319-335, 2010.

Conference Papers

Jessica Davies and Fahiem Bacchus. Postponing Optimization to Speed Up MAXSAT Solving. Proceedings of the 19th International Conference on Principles and Practice of Constraint Programming (CP 2013), 2013.

Jessica Davies and Fahiem Bacchus. Exploiting the Power of MIP Solvers in MAXSAT. Proceedings of the 16th International Conference on Theory and Applications of Satisfiability Testing (SAT 2013), p.166–181, 2013.

Jessica Davies, Nina Narodytska, and Toby Walsh. Eliminating the Weakest Link: Making Manipulation Intractable? Proceedings of the 26th Annual Conference on Artificial Intelligence (AAAI 2012), p.1333–1339, 2012.

Jessica Davies, George Katsirelos, Nina Narodystka, and Toby Walsh. Complexity of and Algorithms for Borda Manipulation. **AAAI outstanding paper award**. Proceedings of the 25th Annual Conference on Artificial Intelligence (AAAI 2011), p.657–662, 2011.

Jessica Davies and Fahiem Bacchus. Solving MAXSAT by Solving a Sequence of Simpler SAT Instances. Proceedings of the 17th International Conference on Principles and Practice of Constraint Programming (CP 2011), p.225–239, 2011.

Jessica Davies, Jeremy Cho, and Fahiem Bacchus. Using Learnt Clauses in MAXSAT. Proceedings of the 16th International Conference on Principles and Practice of Constraint Programming (CP 2010), p.176–190, 2010.

Jocelyn Simmonds, Jessica Davies, Arie Gurfinkel and Marsha Chechik. Exploiting Resolution Proofs to Speed Up LTL Vacuity Detection for BMC. Proceedings of the 7th Conference on Formal Methods of Computer Aided Design (FMCAD 2007), p.3–12, 2007.

Jessica Davies and Fahiem Bacchus. Using More Reasoning to Improve #SAT Solving. Proceedings of the 22nd Conference on Artificial Intelligence (AAAI 2007), p.185–190, 2007.

Horst Samulowitz, Jessica Davies and Fahiem Bacchus. Preprocessing QBF. Proceedings of the 12th International Conference on Principles and Practice of Constraint Programming (CP 2006), p.514–529, 2006.

Workshop Papers

Jessica Davies, George Katsirelos, Nina Narodystka, and Toby Walsh. An Empirical Study of Borda Manipulation. Proceedings of the Third International Workshop on Computational Social Choice (ComSoc 2010), p.91–102, 2010.

Jessica Davies and Fahiem Bacchus. Distributional Importance Sampling for Approximate Weighted Model Counting. The First Workshop on Counting Problems in CSP and SAT, and Other Neighbouring Problems (Counting '08). Sydney, Australia, 2008.

Teaching

Tutorial Assistant, Department of Computer Science, University of Toronto, 2005 – 2011

Computer Organization

Computer Programming, Algorithms and Data Structures

Automata Theory

Introduction to the Theory of Computation

Introduction to Artificial Intelligence

Enriched Introduction to the Theory of Computing

Introduction to Computer Programming

Communication Skills for Computer Scientists

Professional Activities

Program Committee member:

International Workshop on Constraint Modelling and Reformulation (ModRef), 2013

AAAI Conference on Artificial Intelligence, 2012

Reviewer:

Journal of Artificial Intelligence Research

Artificial Intelligence Journal

International Conference on Principles and Practice of Constraint Programming

AAAI Conference on Artificial Intelligence

International Joint Conference on Artificial Intelligence

International Conference on Theory and Applications of Satisfiability Testing

International Workshop on Computational Social Choice

Departmental service:

KR Seminar Organizer, 2008–2009

Grade 8 Designs for Grade 8 Girls outreach volunteer, 2007

Technical Skills

Languages: C, C++, Java, Python, Objective-C

Technical computing environments: Matlab, IBM CPLEX

Distributed cloud computing: Apache Spark, Hadoop, Amazon EC2

Operating Systems: Linux, Max OS X, Windows

Last updated: April 2, 2014