

Personal information

Surname(s) / First name(s)

Samulowitz, Horst

Nationality(-ies)

German

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Yorktown Heights, New York 10598
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<http://www.cs.toronto.edu/~horst>

Education

09/2003-09/2007

Ph.D. Computer Science
University of Toronto, Canada
Artificial Intelligence Group
Supervisor: Prof. F. Bacchus
“Solving Quantified Boolean Formulas”

10/1997-02/2003

M.Sc. Computer Science
RWTH Aachen, Germany
Knowledge-Based Systems Group
Supervisor: Prof. G. Lakemeyer
“Evaluation-Based Reasoning in First-Order Knowledge Bases”

Work Experience

since 10/2010

Post-Doctoral Researcher
Business Analytics and Mathematical Sciences
IBM TJ Watson Research Center, USA
□ Artificial Intelligence for Combinatorial Optimization □ Machine Learning for automated algorithm selection and configuration

08/2009 - 09/2010	<p><i>Researcher</i> National ICT Australia Ltd, Australia Research Centre of Excellence <input type="checkbox"/> Modeling language for search in AI algorithms <input type="checkbox"/> Heuristic Search in AI algorithms</p>
08/2009 - 09/2010	<p><i>Researcher Fellow</i> University of Melbourne, Australia <input type="checkbox"/> Supervision of students and projects</p>
09/2007 - 07/2009	<p><i>Post-Doctoral Researcher</i> Constraint Reasoning and Machine Learning Group Microsoft Research, England <input type="checkbox"/> Online adaptive search in combinatorial algorithms <input type="checkbox"/> Supervision of internship <input type="checkbox"/> Research results employed in product "Microsoft Solver Foundation"</p>
09/2003 - 08/2007	<p><i>Research Assistant</i> Artificial Intelligence Group University of Toronto, Canada <input type="checkbox"/> Research in AI and Knowledge Representation <input type="checkbox"/> Research Group Organizer</p>
07/2006 - 10/2006	<p><i>Internship</i> Constraint Reasoning Group Microsoft Research, England <input type="checkbox"/> Stochastic Constraint Satisfaction</p>
04/1995 - 08/2003	<p><i>Software Developer und System Administrator</i> HEWATT GmbH, Germany <input type="checkbox"/> Software Development for embedded systems <input type="checkbox"/> Simulation of prototypes</p>
05/2001 - 01/2003	<p><i>Founder and CEO</i> IT-Develop AG, Germany <input type="checkbox"/> Development of a contemporary communication platform in the Internet and mobile devices <input type="checkbox"/> Acquisition of funding</p>
02/1999 - 08/2002	<p><i>Research Assistant</i> Virtual Reality Group RWTH Aachen, Germany <input type="checkbox"/> Simulation of prototypes using Virtual Reality <input type="checkbox"/> Parallel projection on 50+ projectors <input type="checkbox"/> Exhibited at CeBIT</p>

Patents

Collaborative Expert Portfolio Management

Microsoft Research, Cambridge, UK

Manage portfolio of experts such as automated problem solvers, algorithms, services or human experts in order to select the most appropriate expert for a given task online at a negligible cost.

Software

Microsoft Solver Foundation

Contributed to the Microsoft Solver Foundation (C#)

<http://www.solverfoundation.com>

G12 - Constraint Reasoning Platform

Contributed to the G12 - Constraint Reasoning Platform (Mercury)

<http://g12.research.nicta.com.au/>

QBF Solvers

Developed multiple award-winning QBF solvers (C++)

http://www.cs.toronto.edu/~horst/index_files/software.html

Teaching, Supervision and Mentoring

Supervision Honours Project

Titel: "Constraint-Based Local Search", University of Melbourne, 2010

Supervision Sommer Student

Titel: "Partial Booleanization of Constraints defined in more Expressive Modelling Languages", University of Melbourne, 2010

Supervision Intern

Titel: "Using Reinforcement Learning to Dynamically Adapt Search when solving Constraint Problems", Microsoft Research, 2008

Teaching Assistant

Lecture: "The How and Why of Computing (CSC 147, University of Toronto)", Topics: HTML, JAVA, Algorithms and Data Structures, Database Systems, Theory of Computation

	Duties included marking assignments and exams, conducting weekly one hour classroom tutorials/lab sessions, maintaining newsgroup and also setting up assignments, tutorials, and lab questions.
	<i>Spring 2007</i>
Mentoring	Mentoring Undergraduate and Master students at the University of Toronto, 2005-2007
Teaching Assistant	Lecture: "Introduction to Artificial Intelligence (CSC 384, University of Toronto)", Topics: What is AI?, Search (e.g., Backtracking/Game Tree Search), Knowledge Representation, Reasoning Under Uncertainty, Planning
	Duties included marking assignments and exams, conducting weekly one hour classroom tutorials, office hours, and setting up assignments/exams.
	<i>Winter 2003, Spring 2004, Winter 2004, Spring 2005, Winter 2005, Spring 2006, Winter 2006</i>
Academic Awards and Funding	
Winner of the International SAT Competition 2011	1st place in both crafted and random category; 7 medals in total (sequential and parallel track)
	http://www.satcompetition.org
Winner of the International QBF Competition 2006	1st, 2nd, and 3rd place on industrial benchmarks:
	http://www.qbflib.org
Ph.D. Scholarship	≈ CAD100.000, University of Toronto, 2003
Interest-free Loan for Start-Up	≈ EUR200.000, Sparkasse Aachen, Germany, 2001

Other Skills

Computer Languages	C#, C++, F#, Python, Java, HTML, PHP, SQL, Prolog, Mercury
Compute Clusters	High-Performance Compute Clusters (Microsoft Windows HPC and Linux clusters)
Spoken Languages	English, German, Dutch fluent Spanish intermediate; French basic

Senior/Program Committee

Program Committee	Twenty-Sixth Conference on Artificial Intelligence, AAAI , 2012
Program Committee	Principles of Knowledge Representation and Reasoning, KR , 2012
Program Committee	Learning and Intelligent Optimization, LION 2012
Senior Program Committee	Twenty-Second International Joint Conference on Artificial Intelligence, IJCAI , 2011
Program Committee	Twenty-Fifth Conference on Artificial Intelligence, AAAI , 2011
Program Committee	Learning and Intelligent Optimization, LION , 2011
Program Committee	Doctoral Programme in Constraint Programming, CP-DP , 2011
Program Committee	Twenty-Fourth Conference on Artificial Intelligence, AAAI , 2010
Program Committee	Learning and Intelligent Optimization, LION , 2010
Program Committee	Doctoral Symposium on Engineering Stochastic Local Search Algorithms, 2009
Program Committee	The International Joint Conference on Artificial Intelligence, IJCAI , 2009
Program Committee	Twenty-Third AAAI Conference on Artificial Intelligence, AAAI , 2008
Program Committee	Workshop on Autonomous Search at the Principles and Practice of Constraint Programming Conference, 2007

Reviewing

CP
2005, 2007, 2009, 2010, 2011

International Conference on Principles and Practice of Constraint Programming

CPAIOR
2010

International Conference on Integration of Artificial Intelligence (AI) and Operations Research (OR) techniques in Constraint Programming

SAT
2006, 2007, 2010, 2011

International Conference on Theory and Applications of Satisfiability Testing

DATE
2010

Design, Automation and Testing Conference

Journal of Heuristics
2009

Journal of Heuristics

JSAT
2008, 2009

Journal of Satisfiability

Grant Proposal
2009

Grant Proposal Review for the Government of Chile

Letters to Constraint Processing
2008

Special Issue on Autonomous Search

PhD. Proposals
2008

PhD. Proposals at Microsoft Research, Cambridge

STAIR
2008

STAIR workshop at the Conference on Artificial Intelligence (AAAI)

NESCAI
2007, 2008

North East Student Colloquium on Artificial Intelligence

AI
2007

Twentieth Australian Joint Conference on Artificial Intelligence

Talks

IBM Austin Research Lab
Austin, 2011

“Algorithm Selection and Scheduling”

IBM TJ Watson Research Lab
New York, 2011

“Automated Algorithm Selection”

DOCOMO Research
Munich, 2010

“Improving Combinatorial Search”

University of Melbourne
Melbourne, 2010

“Design of a Lightweight Standard Search Language”

AAAI 2010 Atlanta, 2010	"Expert Portfolio Manager"
IBM TJ Watson Research Lab New York, 2010	"Improving Combinatorial Search"
NICTA Melbourne, 2009	"Impact-Based Search"
Microsoft Research Cambridge, 2009	"Learning Adaptation to Solve Constraint Satisfaction Problems"
Okinawa Institute of Science and Technology Okinawa, 2009	"Improving Constraint-Based Solvers"
LION 2009 Trento, 2009	"Learning Adaptation to Solve Constraint Satisfaction Problems"
Microsoft Seattle, 2008	"Adaptive Search in Constraint Satisfaction Problems"
University of Durham Durham, 2008	"Improving Constraint-Based Solvers"
Microsoft Research Cambridge, 2007	"Improving Constraint-Based Solvers"
ETH Zürich Zürich, 2007	"Improving Constraint-Based Solvers"
AAAI 2007 Vancouver, 2007	"Learning to Solve QBF"
University of Toronto Toronto, 2007	"Solving Quantified Boolean Formulas"
SAT 2007 Lissabon, 2007	"Dynamically Partitioning for Solving QBF"
Microsoft Research Cambridge, 2007	"Improving Search"
University of Toronto Toronto, 2006	"Propositional Satisfiability"
CP 2006 Nantes, 2006	"Preprocessing Quantified Boolean Formulas"
NESCAI 2006 Cornell University, 2006	"Using SAT in QBF"
NESCAI 2006 Cornell University, 2006	"Preprocessing QBF"
Microsoft Research Cambridge, 2006	"Stochastic Constraint Satisfaction"
CP 2005 Sitges, 2005	"Using SAT in QBF"

University of Toronto
Toronto, 2003
RWTH Aachen
Aachen, 2003
Dagstuhl Seminar
Dagstuhl, 1999

“Efficient Reasoning in First-Order Knowledge Bases”

“Evaluation-Based Reasoning in First-Order Knowledge Bases”

“Visualization of Eclipses and Planetary Conjunction Events: The Interplay between Model Coherence, Scaling and Animation”

List of Taken Graduate Courses

Master of Science

Department of Computer Science
RWTH Aachen
Germany

IMAGE PROCESSING AND COMPUTER GRAPHICS

PERFORMANCE OF COMPUTER COMMUNICATION

INTRODUCTION TO AI

EFFICIENT ALGORITHM DESIGN

OPERATING SYSTEMS

DATABASES

LOGIC OF KNOWLEDGE BASES

LOGIC PROGRAMMING

INTERNET TECHNOLOGY

COMPUTABILITY AND LOGIC (Steve Cook)

MACHINE LEARNING AND NEURAL NETS (Richard Zemel)

CONSTRAINT SATISFACTION PROBLEMS (Fahiem Bacchus)

TOPICS IN GRAPH THEORY (COMPUTATIONAL BIOLOGY) (Michael Brudno)

Doctor of Philosophy

Department of Computer Science
University of Toronto
Canada

References

Fahiem Bacchus, Professor

Department of Computer Science
University of Toronto
Toronto, ON M5S 3G4, Canada
Email: fbacchus@cs.toronto.edu
Website: <http://www.cs.toronto.edu/~fbacchus/>

Ralf Herbrich, Manager

Microsoft Research
United Kingdom
Email: rherb@microsoft.com
Website: <http://research.microsoft.com/en-us/people/rherb>

Gerhard Lakemeyer, Professor

RWTH Aachen
Department of Computer Science
Knowledge-Based Systems Group
Aachen, 52056
Email:
gerhard@informatik.rwth-aachen.de
Website: <http://www-i5.informatik.rwth-aachen.de/gerhard/>

Hector Levesque, Professor

Department of Computer Science
University of Toronto
Toronto, ON M5S 3G4, Canada
Email: hector@cs.toronto.edu
Website: <http://www.cs.toronto.edu/~hector/>

Michael Brudno, Professor

Department of Computer Science and
Computational Biology
University of Toronto
Toronto, ON M5S 3G4, Canada
Email: brudno@cs.toronto.edu
Website: <http://www.cs.toronto.edu/~brudno/>

Refereed Publications

- | | |
|--|---|
| Scheduling for Algorithm Portfolios
[CP2011a], 2011 | Yuri Malitsky, Ashish Sabharwal, Meinolf Sellmann, Horst Samulowitz
17th International Conference Principles and Practice of Constraint Programming (CP) |
| Search Combinators
[CP2011b], 2011 | Tom Schrijvers, Guido Tack, Pieter Wuille, Horst Samulowitz, Peter Stuckey
17th International Conference on Principles and Practice of Constraint Programming (CP) |
| Non-Model-Based Algorithm Portfolios for SAT
[SAT2011], 2011 | Yuri Malitsky, Ashish Sabharwal, Meinolf Sellmann, Horst Samulowitz
Fourteenth International Conference on Theory and Applications of Satisfiability Testing (SAT2011) |
| Collaborative Portfolio Manager
[AAAI2010], 2010 | David Stern, Horst Samulowitz, Luca Pulina, Armando Tacchella, Ralf Herbrich, Thore Graepel
The Twenty-Fourth AAAI Conference on Artificial Intelligence (AAAI2010) |
| Experiments with Massively Parallel Constraint Solving
[IJCAI2009], 2009 | Lucas Bordeaux, Youssef Hamadi, Horst Samulowitz
International Joint Conference on Artificial Intelligence (IJCAI2009) |
| Learning to Solve QBF
[AAAI2007], 2007 | Horst Samulowitz, Roland Memisevic
The Twenty- Second AAAI Conference on Artificial Intelligence (AAAI2007) |
| Dynamically Partitioning for Solving QBF
[SAT2007], 2007 | Horst Samulowitz, Fahiem Bacchus
Tenth International Conference on Theory and Applications of Satisfiability Testing (SAT2007) |
| On the Stochastic Constraint Satisfaction Framework
[SAC2007], 2007 | Lucas Bordeaux, Horst Samulowitz
The 22nd Annual ACM Symposium on Applied Computing (SAC2007) |

**Iterated Expressions in
Constraint Programming**

[JFPC2007], 2007

Preprocessing QBF

[CP2006], 2006

**Binary Clause Reasoning in
QBF**

[SAT2006], 2006

Using SAT in QBF

[CP2005], 2001

**Visualization of eclipses and
planetary conjunction events.
The interplay between model
coherence, scaling and
animation.**

[JVC2001], 2001

3D-Visualization of Music

[GI2001], 2001

**Visualization of eclipses and
planetary conjunction events.
The interplay between model
coherence, scaling and
animation.**

[CGI2000], 2000

**Refereed Workshop
Publications**

**Search Combinators for
MiniZinc**

Lucas Bordeaux, Youssef Hamadi,
Claude-Guy Quimper, and Horst Samu-
lowitz

In Proceedings of Troisième Journées
Francophones de Programmation par
Contraintes (JFPC2007)

Horst Samulowitz, Jessica Davies,
Fahiem Bacchus

12th International Conference on Princi-
ples and Practice of Constraint Program-
ming (CP2006)

Horst Samulowitz, Fahiem Bacchus

Ninth International Conference on The-
ory and Applications of Satisfiability Test-
ing (SAT2006)

Horst Samulowitz, Fahiem Bacchus

11th International Conference on Princi-
ples and Practice of Constraint Program-
ming (CP2006)

Walter Oberschelp, Alexander Hornung,
Horst Samulowitz

The Visual Computer, Vol. 17(5)

Alexander Hornung, Horst Samulowitz

German Society for Computer Science
(GI), Computer Science Days

Walter Oberschelp, Alexander Hornung,
Horst Samulowitz

Computer Graphics International
(CGI2001)

Tom Schrijvers, Pieter Wuille, Horst
Samulowitz, Guido Tack, Peter Stuckey

<p>[MZN2011], 2011</p> <p>Guiding Combinatorial Optimization with UCT [ICAPS2011], 2011</p> <p>Memoizing a Monadic Mixin DSL [WFLP2011], 2011</p> <p>Towards a Lightweight Standard Search Language [MODREF10], 2010</p> <p>Learning Adaptation to Solve Constraint Problems [LION09], 2009</p> <p>Other Refereed Work</p> <p>Solution Backtracking for #SAT [NESCAI2007], 2007</p> <p>Using SAT in QBF [NESCAI2006], 2006</p> <p>Preprocessing QBF [NESCAI2006], 2006</p> <p>Thesis</p> <p>Solving Quantified Boolean Formulas [PHD], 2008</p>	<p>Minizinc Workshop (MZN2011) at the Seventeenth International Conference on Principles and Practice of Constraint Programming (CP 2011) Ashish Sabharwal, Horst Samulowitz</p> <p>ICAPS Monte Carlo Tree Search (MCTS2011) Workshop Tom Schrijvers, Guido Tack, Pieter Wuille, Horst Samulowitz, Peter Stuckey 20th International Workshop on Functional and (Constraint) Logic Programming (WFLP) Horst Samulowitz, Guido Tack, Julien Fischer, Peter Stuckey, Mark Wallace 9th International Workshop on Constraint Modelling and Reformulation (ModRef) Yuehua Xu, David Stern, Horst Samulowitz Learning and Intelligent Optimization (LION)</p> <p>Jessica Davies, Eric Hsu, Horst Samulowitz North East Student Colloquium on Artificial Intelligence (NESCAI) Horst Samulowitz, Fahiem Bacchus North East Student Colloquium on Artificial Intelligence (NESCAI) Horst Samulowitz, Fahiem Bacchus North East Student Colloquium on Artificial Intelligence (NESCAI)</p> <p>Horst Samulowitz PhD Thesis, University of Toronto, 2008</p>
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**The Efficiency and
Implementation of an
Evaluation-Based Reasoning
Procedure with Disjunctive
Information in First-Order
Knowledge Bases**
[MSC], 2003

Horst Samulowitz

Master Thesis, RWTH Aachen, 2003