Dave A. D. Tompkins

Continuing Lecturer
David R. Cheriton School of Computer Science
University of Waterloo

Contact Information

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Education

2010   PhD, Computer Science
University of British Columbia
Dynamic Local Search for SAT: Design, Insights and Analysis
Supervisor: Holger H. Hoos

2000   MASc, Electrical & Computer Engineering
University of British Columbia
Rate Control in Bi-Level Image Coding
Supervisor: Faouzi Kossentini

1996   BESc, Electrical Engineering
University of Western Ontario
Gold Medallist (top graduating student)

1994   BSc, Computer Science
University of Western Ontario

Relevant Employment History

2019.07–	Continuing Lecturer	
	University of Waterloo	
2011.09–2019.06	Lecturer	
	University of Waterloo	
	(on parental leave from 2013.09–2013.12 and 2018.10–2019.02)	
2010.09–2011.08	Postdoctoral Research & Teaching Fellow	
	University of British Columbia	
2004.01–2010.08	Research Assistant	
	University of British Columbia	
	(on medical leave from 2008.09–2009.08)	
1999.09–2008.04	Teaching Assistant	
	University of British Columbia	
2000.08–2001.08	Senior Software Developer	
	UB Video, Inc., Vancouver, BC	
	Development of libraries (JPEG2000, MPEG4) for PCs & embedded DSPs	
2000.01–2002.12	Sessional Lecturer	
	University of British Columbia	
1998.01–2000.08	Research Assistant	
	University of British Columbia	
1997.05–1997.12	Systems Analyst	
	Netcon Technologies, London, ON	
	Developed software and system solutions for clients	
1996.05–1997.04	(Student Council) President	
	University Students' Council, UWO, London, ON	
	Managed a variety of people and services for a large organization	
1995.01–1995.12	Systems Analyst	
	MIS Solutions, Inc., London, ON	
	Developed software and system solutions for clients	
1992.05–1994.08	IT Support & Development	
	Labatt Breweries of Canada, London, ON	
	IT Services: customer support, network administration, application development	
1988.05–	Sole Proprietor	
	`synervations.com`	
	Consulting and development with numerous projects and clients	

Teaching Experience

Course Coordinator (Waterloo)

2013.05–   CS 136 (Elementary Algorithm Design and Data Abstraction)

2015.01–   CS 100 (Introduction to Computing through Applications)

2013.05–2016.06   CS 135 (Designing Functional Programs)

Lecturer (Waterloo)

Term	Course	Class Size	Lecture hours/week	"Effectiveness" Evaluation [†]
2019 Spring	CS 100	237	(online)	n/a
2018 Spring	CS 136	88	3.0	95
2018 Spring	CS 136	85	3.0	96
2018 Winter	CS 136	90	3.0	95
2018 Winter	CS 136	90	3.0	97
2018 Winter	CS 136	88	3.0	98
2017 Fall	CS 135	83	3.0	96
2017 Fall	CS 135	80	3.0	98
2017 Fall	CS 100	389	(online)	n/a
2017 Spring	CS 100	226	(online)	n/a
2017 Winter	CS 136	91	3.0	98
2017 Winter	CS 136	88	3.0	98
2016 Fall	CS 136	78	3.0	95
2016 Fall	CS 136	89	3.0	99
2016 Fall	CS 136	88	3.0	96
2016 Fall	CS 100	357	(online)	n/a
2016 Spring	CS 100	234	(online)	n/a
2016 Winter	CS 136	89	3.0	99
2016 Winter	CS 136	90	3.0	98
2016 Winter	CS 100	344	(online)	n/a
2015 Fall	CS 135	74	3.0	99
2015 Fall	CS 135	82	3.0	99
2015 Fall	CS 100	361	(online)	n/a
2015 Spring	CS 100	225	(online)	n/a
2015 Winter	CS 100	362	(online)	n/a
2014 Fall	CS 135	116	3.0	96
2014 Fall	CS 135	108	3.0	98
2014 Fall	CS 135	117	3.0	96
2014 Winter	CS 136	109	3.0	98
2014 Winter	CS 136	110	3.0	98
2013 Spring	CS 136	89	3.0	93
2013 Spring	CS 350	53	3.0	95

Term	Course	Class Size	Lecture hours/week	"Effectiveness" Evaluation [†]
2013 Spring	CS 350	56	3.0	94
2013 Winter	CS 136	103	3.0	97
2013 Winter	CS 490	25	3.0	97
2012 Fall	CS 135	92	3.0	96
2012 Fall	CS 350	60	3.0	97
2012 Spring	CS 350	56	3.0	94
2012 Spring	CS 350	37	3.0	91
2012 Winter	CS 115	89	3.0	96
2012 Winter	CS 115	92	3.0	93
2012 Winter	CS 490	41	3.0	90
2011 Fall	CS 115	107	3.0	92
2011 Fall	CS 135	73	3.0	92

Full teacher evaluations are available online : `http://www.cs.uwaterloo.ca/˜dtompkin/teaching`

[†] "Effectiveness" Evaluation: average (mean) evaluation for the *Overall Effectiveness* question, normalized to 100. For example, on a 5-point Likert scale, 'Strongly Disagree' is weighted 1 (20/100) and 'Strongly Agree' and is weighted 5 (100/100).

Sessional Instructor (UBC)

Term	Course	Class Size	Lecture hours/week	"Effectiveness" Evaluation [†]
2011 Summer	CPSC 121	63	7.5	70
2010 Fall	CPSC 211	70	3.0	84
2002 Fall	EECE 467	21	2.0	89
2002 Spring	EECE 467	50	2.0	91
2001 Fall	EECE 467	27	2.0	94
2001 Spring	EECE 467	50	2.0	96
2000 Fall	EECE 467	31	2.0	90
2000 Spring	EECE 467	33	2.0	85

Teaching Assistant (UBC)

Term	Course	"Effectiveness" Evaluation [†]
2008 Spring	CPSC 121	96
2007 Spring	CPSC 121	96
2006 Fall	CPSC 320	89
2006 Spring	CPSC 320	97
2005 Summer	CPSC 121	94
2005 Summer	CPSC 320	n/a
2004 Fall	CPSC 320	90
2004 Spring	CPSC 220	n/a
2003 Fall	EECE 466	n/a
2002 Summer	EECE 466	n/a
1999 Fall	EECE 467	n/a

Course Calendar Descriptions (Waterloo)

CS 100   Introduction to Computing through Applications

Using personal computers as effective problem solving tools for the present and the future. Effective use of spreadsheets to process, manipulate, and visualize numeric and textual information. Introduction to the Internet, World Wide Web, HTML, and XML. Algorithms underlying the functional components of web search engines and their influence on data access. Using wikis to publish, reshape, and organize data collaboratively.

CS 115   Introduction to Computer Science 1

An introduction to the fundamentals of computer science through the application of elementary programming patterns in the functional style of programming. Function definition and application. Tracing via substitution. Design, testing, and documentation. Recursive data definitions. Lists and trees. Functional and data abstraction.

CS 135   Designing Functional Programs

An introduction to the fundamentals of computer science through the application of elementary programming patterns in the functional style of programming. Syntax and semantics of a functional programming language. Tracing via substitution. Design, testing, and documentation. Linear and nonlinear data structures. Recursive data definitions. Abstraction and encapsulation. Generative and structural recursion. Historical context.

CS 136   Elementary Algorithm Design and Data Abstraction

This course builds on the techniques and patterns learned in CS 135 while making the transition to use of an imperative language. It introduces the design and analysis of algorithms, the management of information, and the programming mechanisms and methodologies required in implementations. Topics discussed include iterative and recursive sorting algorithms; lists, stacks, queues, trees, and their application; abstract data types and their implementations.

CS 350   Operating Systems

An introduction to the fundamentals of operating system function, design, and implementation. Topics include concurrency, synchronization, processes, threads, scheduling, memory management, file systems, device management, and security.

CS 490   Information Systems Management

The integration of business and technical considerations in the design, implementation and management of information systems. Topics include: IS planning and development; business, management, executive, and strategic information systems, including case studies of selected large- scale systems; decision support systems; end-user training and development; systems security, disaster planning and recovery. Practical examples of information systems in industry.

Course Calendar Descriptions (UBC)

CPSC 101 Connecting with Computer Science
Fundamentals of computer science and their connections with the arts, psychology, and biology. Historical, cultural, and gender perspectives of important contributions to the field will be discussed. (Equivalency: WMST201)

CPSC 121 Models of Computation
Physical and mathematical structures of computation. Boolean algebra and combinations logic circuits; proof techniques; functions and sequential circuits; sets and relations; finite state machines; sequential instruction execution.

CPSC 211 Introduction to Software Development
Software design and the development of robust abstractions; design practices, data abstractions, inheritance, testing, concurrency and distributed computing.

CPSC 220 Introduction to Discrete Structures
An introduction to computer science applications of discrete mathematics. Sets; logic; functions and relations; induction; program correctness; mathematical rigour; algorithms and applications.

CPSC 320 Intermediate Algorithm Design and Analysis
Systematic study of basic concepts and techniques in the design and analysis of algorithms, illustrated from various problem areas. Topics include: models of computation; choice of data structures; graph-theoretic, algebraic, and text processing algorithms.

EECE 466 Digital Signal Processing Systems
DSP fundamentals; digital filter FIR and IIR structures; filter design; DSP architectures; DSP applications.

EECE 467 Real-Time Implementation of DSP Algorithms
DSP systems overview; DSP architectures; programming DSPs in 'C' and Assembly, I/O issues; real-time operating systems; host interfaces; code mapping and optimization; testing; DSP solutions in speech, audio, radar, telecommunications and control.

Scholarships and Awards

Performance Awards

2019   Outstanding Performance Award
          (Faculty)

Teaching Awards

2009   UBC Killiam Graduate Teaching Award
          $1,000 (Institutional)

2007   UBC Computer Science Graduate TA Award
          (Departmental)

2006   UBC Computer Science Graduate TA Award
          (Departmental)

Best Paper Awards

2006   Best Paper Award
          The Nineteenth Canadian Conference on Artificial Intelligence (AI-06)
          (National Conference)

Best Poster Awards

2003	BC Advanced Systems Institute Exchange Communication (Poster) Award $500 (Regional)
1999	BC Advanced Systems Institute Exchange Communication (Poster) Award $200 (Regional)

Service Awards

2010	UBC Graduate Student Society Service Award $500 (Institutional)
2008	UBC Computer Science Service Award (Departmental)

Scholarships

2003	UBC Faculty of Graduate Studies Travel (Conference Paper) Award $400 (Institutional)
2001-2003	Natural Sciences and Engineering Research Council PGS-B Scholarship $38,200 (National)
1999-2000	University of British Columbia University Graduate Fellowship $16,000 (Institutional)
1999	UBC Faculty of Graduate Studies Travel (Conference Paper) Award $400 (Institutional)
1998-1999	Natural Sciences and Engineering Research Council PGS-A Scholarship $31,400 (National)
1994-1996	University of Western Ontario Achievement Awards: Harry Cross Gold Medal (top EE graduating student) John H. Chapman Memorial Prize (top EE student: year 3) Steinmetz-Woonton Award (top EE student: year 2) $1,000 (Institutional)
1991-1996	University of Western Ontario Entrance Scholarship $10,000 (Institutional)
1991-1995	Canada Scholarship $8,000 (National)
1991-1995	Labatt Employee Scholarship $4,000 (Private)

Service to the University Community

2013.07–	Waterloo CS Commons Committee chair since 2015.07
2012.01–2018.10	Undergraduate academic advisor Double Degree Students (Waterloo BCS & Laurier BBA)
1998.01–2011.08	Alma Mater Society of UBC
1998.01–2009.12	Graduate Student Society of UBC
2003.01–2008.04	UBC President's Committee on the Naming of Facilities
2001.10–2006.12	Institute for Computing, Information & Cognitive Systems (ICICS) Student Advisory Committee
2006.12–2006.12	ICICS Director Selection Committee
1999.03–2004.03	UBC Senate *Committees: Budget, Teaching and Learning, Library, Appeals on Academic Standing*
1999.03–2004.03	UBC Faculty of Graduate Studies Council
2000.01–2000.03	UBC Teaching and Learning Enhancement Fund committee

Service to the Academic Community

Program Committees

2011	Twenty-Second International Joint Conference on Artificial Intelligence (IJCAI 11)

(Anonymous) Peer Reviewing

2014	Artificial Intelligence Journal
2013	Sixteenth International Conference on Theory and Applications of Satisfiability Testing (SAT 2013)
2013	Journal of Heuristics
2012	Fifteenth International Conference on Theory and Applications of Satisfiability Testing (SAT 2012)
2011	Ninth Metaheuristics International Conference (MIC 2011)
2011	Fourteenth International Conference on Theory and Applications of Satisfiability Testing (SAT 2011)
2011	Twenty-Second International Joint Conference on Artificial Intelligence (IJCAI 2011)
2008	Computers & Operations Research (Journal)
2008	Eleventh International Conference on Theory and Applications of Satisfiability Testing (SAT 2008)
2007	Twentieth International Joint Conference on Artificial Intelligence (IJCAI 2007)

2007	International Symposium on Combinatorics, Algorithms, Probabilistic and Experimental Methodologies (ESCAPE 2007)
2006	Twelfth International Conference on Principles and Practice of Constraint Programming (CP 2006)
2006	Ninth International Conference on Theory and Applications of Satisfiability Testing (SAT 2006)
2004	Nineteenth National Conference on Artificial Intelligence (AAAI 2004)
2003	Ninth International Conference on Principles and Practice of Constraint Programming (CP 2003)
2003	Sixth International Conference on Theory and Applications of Satisfiability Testing (SAT 2003)
2003	IEEE Transactions on Image Processing (Journal)

Professional Development

2012	Instructional Skills Workshop
2010	From TeachScheme to ReachJava: How to Design Programs (HtDP) teaching workshop.
2001	Stochastic local search workshop, IJCAI-01.
2001	Empirical analysis and methods workshop, IJCAI-01.
1997	Dale Carnegie course in professional communication.

Publications

Refereed Conference Proceedings

[1] Sam Bayless, Dave A. D. Tompkins, and Holger H. Hoos. Evaluating instance generators by configuration. In Panos M. Pardalos, Mauricio G. C. Resende, Chrysafis Vogiatzis, and Jose L. Walteros, editors, *Proceedings of the Eighth International Conference on Learning and Intelligent Optimization (LION-14)*, volume 8426 of *Lecture Notes in Computer Science*, pages 47–61. Springer Berlin / Heidelberg, 2014. *(acceptance rate: 48%).*

[2] Dave A. D. Tompkins, Adrian Balint, and Holger H. Hoos. Captain Jack: New variable selection heuristics in local search for SAT. In Karem Sakallah and Laurent Simon, editors, *Proceedings of the Fourteenth International Conference on Theory and Applications of Satisfiability Testing (SAT 2011)*, volume 6695 of *Lecture Notes in Computer Science*, pages 302–316. Springer Berlin / Heidelberg, 2011. *(acceptance rate: 44%).*

[3] Dave A. D. Tompkins and Holger H. Hoos. Dynamic scoring functions with variable expressions: New SLS methods for solving SAT. In Ofer Strichman and Stefan Szeider, editors, *Proceedings of the Thirteenth International Conference on Theory and Applications of Satisfiability Testing (SAT 2010)*, volume 6175 of *Lecture Notes in Computer Science*, pages 278–292. Springer Berlin / Heidelberg, 2010. *(acceptance rate: 38%).*

[4] Dave A. D. Tompkins and Holger H. Hoos. On the quality and quantity of random decisions in stochastic local search for SAT. In Luc Lamontagne and Mario Marchand, editors, *Proceedings of the Nineteenth Conference of the Canadian Society for Computational Studies of Intelligence (AI 2006)*, volume 4013 of *Lecture Notes in Artificial Intelligence*, pages 146–158. Springer Berlin / Heidelberg, 2006. **(Best Paper Award)** *(acceptance rate: 21%)*.

[5] Dave A. D. Tompkins and Holger H. Hoos. UBCSAT: An implementation and experimentation environment for SLS algorithms for SAT and MAX-SAT. In Holger Hoos and David Mitchell, editors, *Revised Selected Papers from the Seventh International Conference on Theory and Applications of Satisfiability Testing (SAT 2004)*, volume 3542 of *Lecture Notes in Computer Science*, pages 306–320. Springer Berlin / Heidelberg, 2005. *(acceptance rate: 33%)*.

[6] Dave A. D. Tompkins and Holger H.Hoos. Warped landscapes and random acts of SAT solving. In *Proceedings of the Eighth International Symposium on Artificial Intelligence and Mathematics (AI&MATH 2004)*, 2004. *(acceptance rate: 47%)*.

[7] Dave A. D. Tompkins and Holger H. Hoos. Scaling and probabilistic smoothing: Dynamic local search for unweighted MAX-SAT. In Yang Xiang and Brahim Chaib-draa, editors, *Proceedings of the Sixteenth Conference of the Canadian Society for Computational Studies of Intelligence (AI 2003)*, volume 2671 of *Lecture Notes in Artificial Intelligence*, pages 145–159. Springer Berlin / Heidelberg, 2003. *(acceptance rate: 28%)*.

[8] Frank Hutter, Dave A. D. Tompkins, and Holger H. Hoos. Scaling and probabilistic smoothing: Efficient dynamic local search for SAT. In Pascal Van Hentenryck, editor, *Proceedings of the Eighth International Conference on Principles and Practice of Constraint Programming (CP 2002)*, volume 2470 of *Lecture Notes in Computer Science*, pages 233–248. Springer Berlin / Heidelberg, 2002. *(acceptance rate: 30%)*.

[9] Dave A. D. Tompkins and Faouzi Kossentini. A fast segmentation algorithm for bi-level image compression using JBIG2. In *Proceedings of the 1999 IEEE International Conference on Image Processing (ICIP 1999)*, volume 1, pages 224–228. IEEE Computer Society Press, 1999. **(Invited Paper)**.

[10] Magesh Valliappan, Brian L. Evans, Dave A. D. Tompkins, and Faouzi Kossentini. Lossy compression of stochastic halftones with JBIG2. In *Proceedings of the 1999 IEEE International Conference on Image Processing (ICIP 1999)*, volume 1, pages 214–218. IEEE Computer Society Press, 1999. **(Invited Paper)**.

Theses

[11] Dave A. D. Tompkins. *Dynamic Local Search for SAT: Design, Insights and Analysis*. PhD Thesis, University of British Columbia, October 2010.

[12] Dave A. D. Tompkins. *Rate Control in Bi-Level Image Coding*. Master of Applied Science, University of British Columbia, August 2000.

Technical Reports

[13] Dave A. D. Tompkins. MAX-SAT 2012: ubcsat-irots. Solver Description, MAX-SAT 2012 Competition Booklet, 2012. **(Won Several Categories in the Incomplete Solver Track – 2012)**.

[14] Adrian Balint, Andreas Fröhlich, Dave A. D. Tompkins, and Holger H. Hoos. Sparrow2011. Solver Description, SAT 2011 Competition Booklet, 2011. **(Won 2 Gold Medals – 2011)**.

[15] Holger H. Hoos and Dave A. D. Tompkins. Novelty$^+$ and Adaptive Novelty$^+$. Solver Description, SAT 2004 Competition Booklet, 2004. **(Won 2 Gold Medals – 2004)**.

[16] Dave A. D. Tompkins, Frank Hutter, and Holger H. Hoos. Scaling and Probabilistic Smoothing (SAPS). Solver Description, SAT 2004 Competition Booklet, 2004. **(Won 2 Silver Medals – 2004)**.

[17] Dave Tompkins and Faouzi Kossentini. JBIG2 halftones: Analysis and considerations for T.89. Technical Submission, ITU-T SG8, November 1999.

[18] Dave Tompkins and Faouzi Kossentini. Additional extension segments in JBIG2. Technical Report N1318, ISO/IEC JTC1 SC29 WG1, July 1999.

[19] Faouzi Kossentini, Dave Tompkins, Soeren Forchhammer, Bo Martins, Ole Jensen, Ian Caven, and Paul Howard. JBIG-like coding of bi-level image data in JPEG-2000. Technical Report N1014, ISO/IEC JTC1 SC29 WG1, October 1998.

[20] Dave Tompkins and Faouzi Kossentini. Coding of numerical data in JBIG-2. Technical Report N862, ISO/IEC JTC1 SC29 WG1, July 1998.

Posters & Non-Refereed Conference Papers

[21] Dave Tompkins. Dynamic local search for SAT. Poster, British Columbia Advanced Systems Institute Exchange, 2003. **(Best Poster Award)**.

[22] Dave A. D. Tompkins and Faouzi Kossentini. Lossless JBIG2 coding performance. In James A. Storer and Martin Cohn, editors, *Proceedings of the 1999 Data Compression Conference (DCC 1999)*, page 553. IEEE Computer Society Press, 1999. (abstract).

[23] Dave Tompkins. Document image compression. Poster, British Columbia Advanced Systems Institute Exchange, 1999. **(Best Poster Award)**.

Selection of Invited Talks & Presentations

2017.05	"SAT, Incomplete Algorithms and Graph Colouring." Canadian Computing Olympiad. Waterloo, ON.
2010.11	"Scientific Citizens." UBC 2010 Fall Graduation (Science Ceremony). Vancouver, BC.
2010.11	"The Satisfiability Problem." Vancouver Mensa Group. Vancouver, BC.
2005.03	"Adventures in SAT Solving." UBC Graduate Student Recruitment Talk. Vancouver, BC.

2000.04 "JBIG2 Halftoning." University of Texas at Austin. Austin, TX.