

# Curriculum Vitae

for Bob Price

## Contact Information

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## Research Interests

I am interested in human and machine learning and what they can tell us about each other, particularly in a social setting. Recently I have completed a major project examining how insights about the social nature of human learning provide the inspiration for a new model of machine imitation that can dramatically accelerate reinforcement learning in a multi-agent context. In conjunction with this work I have recently started examining game-theoretic issues facing agents that imitate and how qualities of human utilities (such as peer relative values) affect game-theoretic mechanisms. I have also worked on extending reinforcement learning to a symbolic first-order representation and have started a project to look at how recent results in human memory research and text retrieval can be combined with machine learning techniques to optimize presentation in computer-based tutoring systems.

## Academic Background

Ph.D. University of British Columbia <i>Supervisor: Craig Boutilier</i> <i>Dissertation: Accelerating Reinforcement Learning with Imitation</i>	(Expected February 2003)
M.Sc. University of Saskatchewan <i>Supervisor: Gordon McCalla</i> <i>Thesis: Knowledge Sharing by Imitation</i>	1995
B.C.S. Carleton University, Cum Laude <i>Specialization in Business Systems</i> <i>Supervisor: Franz Oppacher</i> <i>Honours Paper: A Case-based Physics Tutoring System</i>	1993

## Industrial and Research Experience

University of Toronto, Department of Computer Science <i>Visiting Student, Research Assistant, Teaching Assistant.</i> <i>Worked on: reinforcement learning, imitation, first-order MDPs</i>	Summer 1999 - Present
University of British Columbia, Department of Computer Science <i>Ph.D. Candidate, Research Assistant.</i> <i>Worked on: reinforcement learning, imitation,</i> <i>neural control of soccer playing "car" robots</i>	1995-1999
University of Saskatchewan, Department of Computer Science <i>M.Sc. Candidate, Research Assistant.</i> <i>Worked on: field trial of LISP programming tutor,</i> <i>self-organizing neural network models</i>	1993-1995
Carleton University, Department of Physics <i>Developed shell for authoring physics courseware glossary</i>	Summer 1993
Bell Northern Research (Nortel), Computing Research Lab <i>Developed interface and planner for CASE tool</i>	2 Terms 1991-1992
Bell Northern Research (Nortel), Advanced Applications <i>Integration testing for expert-system network monitor</i>	Fall Term 1990
Compu-Sys Micro-Solutions Inc. <i>Technical support and customer training</i>	Summers 1985-88
Lumonics, Inc., Research Assistant <i>Modeled laser power supplies</i>	Summer 1986

## Publications

### ***Published in Refereed Journals***

Price, B. and C. Boutilier.

*Accelerating Reinforcement Learning through Implicit Imitation.*

Journal of Artificial Intelligence Research, Accepted subject to revisions. Revisions complete (2002).

### ***Published in Refereed Conferences***

Boutilier, C., R. Reiter and B. Price.

*Symbolic Dynamic Programming for First-Order MDPs.*

Proceedings of the Seventeenth International Joint Conference on Artificial Intelligence (IJCAI-01), Seattle, pp. 690-697 (2001).

Price, B. and C. Boutilier.

*Imitation and Reinforcement Learning in Agents with Heterogeneous Actions.*

Proceedings of the Fourteenth Canadian Conference on Artificial Intelligence (AI '01), Ottawa, pp. 111-120 (2001).

Price, B. and C. Boutilier.

*Implicit Imitation in Multi-agent Reinforcement Learning.*

Proceedings of the Sixteenth International Conference on Machine Learning (ICML-99), Bled, Slovenia, pp. 325-334 (1999).

Greer, J.E., G. I. McCalla, B. Price and P. Holt.

*Supporting the Learning of Recursion at a Distance.*

World Conference on Multimedia and Hypermedia, Vancouver, pp. 652 (1994).

Price, B., G.I. McCalla, and J.E. Greer.

*Combining Scaffolding and Diagnosis in a Distributed Tutoring System.*

East-West Conference on Computer Technologies in Education (EW-ED), Simferopol, Ukraine (1994).

Price, B. and L. Price.

*Value-Driven Learning in Autonomous Information Agents.*

Seventh International Conference on Systems Research, Informatics and Cybernetics, Baden-baden, Germany (1994).

## **Publications (continued)**

### ***Published in Refereed Workshops***

Boutilier, C., R. Reiter and B. Price.

*Symbolic Dynamic Programming for First-Order MDPs.*

Common Sense 2001: Fifth Symposium on Logical Formalizations of Commonsense Reasoning New York, NY, May, (2001).

Price, B. and C. Boutilier.

*Imitation and Reinforcement Learning with Heterogeneous Actions.*

Proceedings of the Society for the Study of Artificial Intelligence and the Simulation of Behaviour (AISB-2000), Birmingham, UK, pp. 85-92 (2000).

Price, B. and C. Boutilier. (1999).

*Implicit imitation in multi-agent reinforcement learning.*

IJCAI-99 Workshop on Agents Learning About, From and With Other Agents, Stockholm (1999).

### ***Poster Presentations***

Price, B.

*Imitation and Reinforcement Learning.*

Eighth Annual PRECARN / IRIS Conference, Vancouver (1998).

### ***Submitted and in Preparation***

Price, B. and C. Boutilier.

*A Bayesian Approach to Imitation in Reinforcement Learning.*

Submitted to The Eighteenth International Joint Conference on Artificial Intelligence (IJCAI-03).

Price, B. and C. Boutilier.

*Assessing the Relative Quality of an Imitator's Knowledge Sources in Domains with Continuous Attributes.*

In preparation for The Second International Symposium on Imitation in Animals and Artifacts at AISB '03.

## **Grants, Scholarships and Fellowships**

NSERC Industrial Research Fellowship (Declined)	2002
NSERC PGS B, University of British Columbia	1995-97
ASI Scholarship, University of British Columbia	1995
University Graduate Scholarship, University of Saskatchewan	1993-95
William E. Beckel Scholarship, Carleton University	1992
A. Davidson Dunton Scholarship, Carleton University	1990
Hyman Soloway Scholarship, Carleton University	1989
Honeywell Bull Limited Scholarship, Carleton University	1989
Entrance Scholarship, University of Ottawa (declined)	1988
Dean's Honour List, Carleton University	1989,90,92

## **Professional Activities**

### ***Refereed for***

Uncertainty in Artificial Intelligence 2001

A special issue of the Journal of Mimetics 2000

Journal of Machine Learning Research 2003

Volunteer at Sixteenth Conference on Uncertainty in Artificial Intelligence (UAI), Stanford

Organized volunteer pool for University of British Columbia open-house exhibition

Maintain the web site on computational imitation

Member of American Association of Artificial Intelligence and Canadian Society for Computational Studies of Intelligence

Co-organized LCI-ML seminar series on Machine Learning at University of British Columbia

Co-organized AI-Prob series on probabilistic reasoning at University of Toronto

## Teaching

T.A. for University of Toronto CSC 384: Intro to AI <i>Over two years, I developed materials for knowledge representation, search, resolution, probabilistic reasoning and planning</i>	2001-2002
U. of T. Teaching Assistant Training Program Courses <i>Commenting on student's papers effectively, Cultural diversity in the classroom, Instructional technology, Teaching tips for different styles, Using teaching dossiers. Tips and tricks for teaching mathematics</i>	2001
Teaching Evaluation Workshop <i>I was video taped giving a sample lesson and then critiqued</i>	March 2002
AI-Prob Seminar Series at University of Toronto <i>co-organized with Pascal Poupart, gave several talks on probability, learning, quantum computation</i>	2000-2002
LCI ML Seminar Series at University of British Columbia <i>organized reading series on machine learning with Richard Dearden and gave a number of talks</i>	1998-2000
Tutoring system theory and evaluation <i>participated in field testing of LISP programming tutoring systems based on scaffolding techniques</i>	1993-1994
Micro-Computer Programming Course <i>Developed and taught a one week, full day course on essentials of micro-computer programming for public school</i>	1983
Computer Skills Training Courses <i>Taught users to use a variety of PC applications using on-line course-ware and hands-on problem solving</i>	1985-88

## Computing Technologies

### *Programming Languages*

Java (30,000 line simulator), C and C++ (30-100k line industrial experience),  
Prolog (industrial experience with CASE tools),  
Scheme, Lisp (Large tutoring systems), Matlab, Fortran  
HTML, OMT (UML), OOA/OOD

### *Environments*

Unix, Windows, IBM 370, Key Punch

## Leadership, Outreach and Volunteer

Treasurer Campus Co-op Residence Inc.	2002-03
Treasurer for federal riding association	2001-02
Director on the Board of Campus Co-op Residence Inc.	1999-03
Executive of Acadia Park Residence Association, UBC	1996-98
University of Saskatchewan <i>Computer Science Graduate Student's Society President</i>	1992-93
Founding member of a food co-operative in Vancouver	1997-98

## Informal Activities

Cycling and Canadian fiddle playing

Last updated January 14, 2003