

Scott P. Sanner

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OBJECTIVE To work in applied research and teaching in an area related to artificial intelligence and machine learning.

EDUCATION *University of Toronto, Toronto, ON, Canada*

- Ph.D. Computer Science, 2007; Advisor: Craig Boutilier
- Specialization: AI – Planning under Uncertainty
- Dissertation Title: First-order Decision-theoretic Planning in Structured Relational Environments
- Cumulative GPA: 4.08 / 4.33

Stanford University, Stanford, CA, USA

- M.S. Computer Science, 2002; Advisor: Richard Fikes
- Specialization: AI – Knowledge Representation and Reasoning
- Cumulative GPA: 3.86 / 4.33

Carnegie Mellon University, Pittsburgh, PA, USA

- B.S. in Electrical and Computer Engineering, 1999
- B.S. in Computer Science, 1999
- Cumulative GPA: 3.92 / 4.00 (University Honors)

EXPERIENCE *Researcher, Statistical Machine Learning Program, NICTA • Adjunct, Computer Sciences Laboratory, Australian National University • July 2007 – Present • Program Head: Alex Smola*

- Design, theoretical analysis, and implementation of algorithms for decision-theoretic planning and reinforcement learning
- Undergraduate and graduate course instruction
- PhD student supervision

Intern, Microsoft Research, Cambridge (UK) • Fall 2006
Advisors: Thore Graepel and Ralf Herbrich

- Design and empirical evaluation of algorithms for learning conditional Markov random fields with hierarchical features
- Implementation and integration of learning algorithms into an existing C# codebase for predicting territory in the game of Go

Intern, Toyota Technological Institute at Chicago • Summer 2004
Advisor: David McAllester

- Design and theoretical exploration of an affine extension to the algebraic decision diagram (ADD) data structure
- Application of this data structure to optimal probabilistic inference for Bayesian networks and sequential decision making in stochastic processes

Intern, Sun Microsystems Research Labs • Summer 1999, 2001, 2002
Advisor: Bill Woods

- Instrumentation of existing C++ web indexing codebase for timing and resource load experiments used in algorithm analysis and optimization
- Co-design of an efficient algorithm for natural language indexing of web pages based on a taxonomic knowledge representation framework

**Research Programmer, Lawrence Livermore National Labs (LLNL),
US Department of Energy • Jan. 1999 - Aug. 2000**

- Co-development of an autonomous network vulnerability inference system for integrating network data collection with real-time vulnerability detection
- Integration of Java, Oracle, and LISP systems under a unified architecture

Intern, Lockheed Martin • Summer 1998 • Advisor: Dan Bondy

- Design, C++ coding, and verification of optimization and numerical methods for a mathematical model of satellite control
- Data analysis, numerical algorithm prototyping, and formula derivation using MathCAD

Intern, National Cancer Institute • Summer 1997 • Advisor: Matt Fivash

- C++/Matlab programming and design of graphical user interface tools for automated data analysis in structural protein chemistry experimentation
- Implementation of numerical and signal processing algorithms for digital filtering, nonlinear regression, and numerical optimization

TEACHING Guest Lecturer • Intro. to Statistical Machine Learning • Winter 2008
Computer Sciences Laboratory, Australian National University

Tutor • Topics in Automated Reasoning • Winter 2006
Department of Computer Science, University of Toronto

Tutor • Computer Organization and Design • Winter 2003 – 2006
Department of Computer Science, University of Toronto

Lab Instructor • Information Systems Infrastructure • Fall 2005
Department of Mechanical and Industrial Engineering, University of Toronto

Tutor • Software Tools and Systems Programming • Fall 2004 – 2005
Department of Computer Science, University of Toronto

Lab Instructor • Knowledge Modeling and Management • Fall 2004
Department of Mechanical and Industrial Engineering, University of Toronto

PROFESSIONAL Program Committee

ACTIVITIES • *International Conf. on Automated Planning and Scheduling (ICAPS) (2008)*

Reviewing

- *Journal of AI Research (JAIR) (2007)*
- *AI Journal (AIJ) (2007)*
- *Annals of Mathematics and AI (AMAI) (2007)*
- *Uncertainty in AI (UAI) (2005)*
- *International Joint Conference on AI (IJCAI) (2005)*

INVITED PRESENTATIONS • *AI Seminar • University of Waterloo • Sept 20, 2007*
Title: *Approximate solution techniques for factored first-order MDPs*

• *Learning in Intelligent Systems Seminar • M.I.T. • May 24, 2007*
Title: *Approximate solution techniques for factored first-order MDPs*

• *Reinforcement Learning/AI Seminar • University of Alberta • July 4, 2006*
Title: *Relational reinforcement learning and feature discovery*

- **Description Logic Seminar • Univ. of Manchester • June 6, 2006**

Title: *An ordered theory resolution calculus for hybrid reasoning in first-order extensions of description logic*

- **Comp. Learning and Adaptation Seminar • Stanford • Jan. 18, 2001**

Title: *Efficient and cognitively plausible learning in backgammon*

AWARDS • **2nd Place, ICAPS 2006 International Probabilistic Planning Competition**

- **Armed Forces Communications Electronics Association (AFCEA Washington Chapter) Scholarship recipient**

- **Carnegie Mellon University Presidential Scholarship recipient**

- **Tau Beta Pi Engineering Honor Society**

PUBLICATIONS

- **Approximate solution techniques for factored first-order MDPs.** S. Sanner, and C. Boutilier (2007). *In Proceedings of the 17th Conference on Automated Planning and Scheduling (ICAPS-07).*
- **Learning CRFs with hierarchical features: An application to the game of Go.** S. Sanner, T. Graepel, R. Herbrich, and T. Minka (2007). *In Proceedings of the Workshop on Constrained Optimization and Structured Output Spaces (at ICML-07).*
- **Symbolic dynamic programming.** S. Sanner, and K. Kersting (2007). *Chapter to appear in C. Sammut, editor, Encyclopedia of Machine Learning, Springer-Verlag.*
- **Practical linear value-approximation techniques for first-order MDPs.** S. Sanner, and C. Boutilier (2006). *In Proceedings of the 22nd Conference on Uncertainty in AI (UAI-06).*
- **An ordered theory resolution calculus for hybrid reasoning in first-order extensions of description logic.** S. Sanner, and S. McIlraith (2006). *In Proceedings of the 10th International Conference on Principles of Knowledge Representation and Reasoning (KR-2006).*
- **Online feature discovery in relational reinforcement learning.** S. Sanner (2006). *In Proceedings of the Open Problems in Statistical Relational Learning Workshop (SRL-06).*
- **Affine algebraic decision diagrams (AADDs) and their application to structured probabilistic inference.** S. Sanner, and D. McAllester (2005). *In Proceedings of the 19th International Joint Conference on AI (IJCAI-05).*
- **Approximate linear programming for first-order MDPs.** S. Sanner, and C. Boutilier (2005). *In Proceedings of the 21st Conference on Uncertainty in AI (UAI-05).*
- **Simultaneous learning of structure and value in relational reinforcement learning.** S. Sanner (2005). *In Proceedings of the Rich Representations for Relational Reinforcement Learning Workshop (at ICML-2005).*

- **Learning hierarchical object maps of non-stationary environments with mobile robots.** D. Anguelov, R. Biswas, D. Koller, B. Limketkai, S. Sanner, and S. Thrun (2002). *In Proceedings of the 18th Conference on Uncertainty in AI (UAI-02)*.
- **Towards object mapping in dynamic environments with mobile robots.** R. Biswas, B. Limketkai, S. Sanner, and S. Thrun (2002). *In Proceedings of the Conference on Intelligent Robots and Systems (IROS-02)*.
- **Achieving efficient and cognitively plausible learning in backgammon.** S. Sanner, J. R. Anderson, C. Lebiere, and M. Lovett (2000). *In Proceedings of the 17th International Conference on Machine Learning (ICML-2000)*.

TECHNICAL REPORTS / UNPUBLISHED WORKS • **Future directions for first-order decision-theoretic planning.** S. Sanner (2005). Research Proposal, University of Toronto.

- **Refutation-complete binary decision diagrams.** S. Sanner (2004). Unpublished.
- **Relational and first-order decision-theoretic planning: Foundations and future directions.** S. Sanner (2004). *Depth Report, University of Toronto*.
- **Towards practical taxonomic classification for description logics on the Semantic Web.** S. Sanner (2003). *Technical Report, Stanford University, Knowledge Systems Lab: KSL-03-06*.

EXTRACURRICULAR • Capoeira (Afro-Brazilian Martial Art) and Taekwondo (Korean Martial Art)

References Available Upon Request