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Roshan Shariff

Curriculum Vitae

Education

2015– **Ph.D. Computing Science**, *University of Alberta*, *Edmonton*, *in progress.*
in Statistical Machine Learning

Advisor Prof. Csaba Szepesvári

2012–2015 **M.Sc. Computing Science**, *University of Alberta*, *Edmonton*, *4.0 GPA.*

Advisor Prof. Csaba Szepesvári

Thesis Exploiting Symmetries to Construct Efficient MCMC Algorithms With an Application to SLAM
Outstanding Thesis Award (M.Sc.) in the Department of Computing Science

2011–2012 **B.Sc. Honours Mathematics**, *University of Alberta*, *Edmonton*, *3.7 GPA.*
with First Class Honours

2007–2011 **B.Sc. Honours Computing Science**, *University of Alberta*, *Edmonton*, *3.9 GPA.*
with Gold Medal in Computing Science and First Class Honours

Publications

Refereed Conferences

2020 Efficient Planning in Large MDPs with Weak Linear Function Approximation.
Roshan Shariff and Csaba Szpesvári.
In *Neural Information Processing Systems (NeurIPS)*, Dec. 6–12, Online. *(20% acceptance)*

2018 Differentially Private Contextual Linear Bandits.
Roshan Shariff and Or Sheffet.
In *Neural Information Processing Systems (NeurIPS)*, Dec. 2–8, Montréal. *(21% acceptance)*

2016 Conservative Bandits.
Yifan Wu, *Roshan Shariff*, Tor Lattimore, and Csaba Szepesvári.
In *International Conference on Machine Learning (ICML)*, June 20—22, New York. *(25% acceptance)*

2015 Exploiting Symmetries to Construct Efficient MCMC Algorithms With an Application to SLAM.
Roshan Shariff, András György, and Csaba Szepesvári.
In *AI & Statistics (AISTATS)*, May 9–12, San Diego. *(29% acceptance)*

Workshops & Lightly-Refereed Conferences

2019 Discounted Reinforcement Learning is Not an Optimization Problem.
Abhishek Naik, *Roshan Shariff*, Niko Yasui, Richard S. Sutton.
In *Optimization Foundations for Reinforcement Learning Workshop, Neural Information Processing Systems (NeurIPS)*, Dec. 14, Vancouver.

2019 A Value Function Basis for Nexting and Multi-step Prediction.
Andrew Jacobsen, Vincent Liu, *Roshan Shariff*, Adam White, Martha White.
In *Reinforcement Learning & Decision Making (RLDM)*, July 7–10, Montréal.

2013 Lunar Lander: A Continous-Action Case Study for Policy-Gradient Actor-Critic Algorithms.
Roshan Shariff and Travis Dick.
In *Reinforcement Learning & Decision Making (RLDM)*, Oct. 25–27, Princeton.

2010 A Markov Chain Monte Carlo Approach To Simultaneous Localization and Mapping.
Roshan Shariff, Péter Torma, András György, Csaba Szepesvári.
In workshop on *Monte Carlo Methods for Bayesian Inference in Modern Day Applications, Neural Information Processing Systems (NIPS)*, Dec. 10, Vancouver and Whistler.

Awards and Honors

2015 Outstanding Thesis Award (M.Sc.), Department of Computing Science, University of Alberta

2011 Gold Medal in Computing Science (highest GPA in last three years of undergraduate program)

Graduate Scholarships

2017–2019 NSERC Alexander Graham Bell Canada Graduate Scholarship — Doctoral Program (Federal)
$70,000 over two years.

2017–2019 University of Alberta President's Doctoral Prize of Distinction
$10,000 for first year, cost of tuition thereafter.

2016–2019 Alberta Innovates — Technology Futures Graduate Student Scholarship (Provincial)
$31,500 per year; $12,000 per year when in conjunction with NSERC CGS-D.

2015 University of Alberta Doctoral Recruitment Scholarship
$20,000 over one year.

2012 Alberta Innovates — Technology Futures Graduate Student Scholarship (Provincial)
$26,500 over one year.

Undergraduate Scholarships

2007–2011 University of Alberta and Faculty of Science Academic Excellence Scholarships, Registrar's International Student Scholarship
$28,000 over four years.

2010, 2011 University of Alberta Undergraduate Scholarship

2008, 2009 Canadian Information Processing Society (CIPS) and CIPS Stan Heaps Memorial Scholarships

2008 Intuit Canada Undergraduate Scholarship in Computing Science

Competitions

2009, 2010 Placed first twice in the Rocky Mountain Regionals of the ACM Intercollegiate Programming Contest (ICPC), qualifying for the World Finals.

2008 Participated in the CS Games at the Université de Sherbrooke in Québec in the AI, debugging, and scripting competitions; placed first in all three.

Research and Academic Interests

Reinforcement Learning — Autonomous agents that learn in complex environments, usually with large or continuous actions and observation spaces; efficiently exploring large environments.

Machine Learning — Using the idea of *symmetry* to learn domain-specific representations that improve machine learning performance; differential privacy for safeguarding sensitive information.

Attended the Deep Learning and Reinforcement Learning Summer Schools (DLSS & RLSS 2017), June 26 – July 5, Montréal, Canada.

Statistical Inference — Procedures for sequential decision making that are provably optimal; Bayesian reasoning and risk minimization.

Robotics — Probabilistic models for robot sensing, navigation, and decision making; the Simultaneous Localization and Mapping (SLAM) problem.

Algorithms and Complexity — Analysis of algorithms with respect to complexity, approximation algorithms and approximability of NP-hard problems.

Programming Language Theory — Functional programming, mathematical tools to analyse program semantics (e.g. type theory, category theory, denotational semantics). Correspondence between computer programs and mathematical proofs. Automated techniques to introduce semantic changes like massively parallel and/or concurrent computation.

Invited Talks

2018 "Predicting Rewards at Every Time Scale" at the Princeton Neuroscience Institute, June 28, Princeton; and at Kindred, Inc., July 11, Toronto.

Research Experience

Jan–May 2019 Intern at Google DeepMind in London, UK. Completed a 20 week research internship working on the theory of reinforcement learning as part of the Foundations team.

Oct 2018 Visiting scholar at the "Focus Period on Learning and Adaptation for Sensorimotor Control" at the Linnaeus Lund Center for Control of Complex Engineering Systems (LCCC), Lund University, Sweden. Collaborated with other young researchers over a period of three weeks, along with delivering a research seminar and attending a workshop.

Teaching Experience

2016 Principal instructor for CMPUT 275 "Introduction to Tangible Computing" at the University of Alberta. Prepared lectures and exercises, graded coursework, and performed evaluations of student projects.

2014, 2015 Teaching assistant for two offerings of CMPUT 275 "Introduction to Tangible Computing" at the University of Alberta. Ran office hours and help sessions for students, graded coursework, and interviewed students for final project evaluations.

2013 Prepared a 90-minute presentation on "Programming with Monads" for the Edmonton Functional Programming User Group (EFPUG).

2010, 2012 Volunteered for the Mathematics Summer Camp for high school students at the University of Alberta organized by Prof. Piotr Rudnicki. Facilitated learning about programming and mathematical concepts in a setting with small groups of advanced students.

Service and Outreach

2016 Served as the elected Councilor representing the Department of Computing Science at the University of Alberta Graduate Students' Association.

Reviewing

2015, 2020 Neural Information Processing Systems (NeurIPS) conference

2017, 2020 Conference on Learning Theory (COLT)

2016–17, 2019–20	International Conference on Machine Learning (ICML)
2020	Journal of Machine Learning Research (JMLR)
2018	Machine Learning Journal (MLJ)
2014, 2018	AAAI Conference on Artificial Intelligence
2017	Conference on Algorithmic Learning Theory (ALT)
2016	International Conference on Robotics and Automation (ICRA)

Volunteering

2019	Volunteered to assist a blind participant at the Deep Learning & Reinforcement Learning Summer School (DLRLSS).
2016	Volunteered at the International Conference on Machine Learning (ICML).
2015	Volunteered at the Algorithmic Learning Theory/Discovery Science (ALT/DS) conference.
2011, 2012	Volunteered at the Rocky Mountain Regionals of the ACM Intercollegiate Programming Contest.
2010	Participated in a University Open House, representing the Department of Computing Science to prospective students and the public.
2008–2009	Tutored undergraduate students in mathematics and physics.

Personal Information

Languages	English, basic knowledge of Hindi.
Computer skills	Programming in C, C++, Java, Python, Julia, Scheme, LISP, Haskell, MATLAB/Octave; experience with the Coq proof assistant, symbolic algebra in Maxima, document preparation in LaTeX.
Nationality	Canadian