33rd Conference on Uncertainty in Artificial Intelligence 2017

Sydney, Australia
11-15 August 2017

Volume 1 of 2

Editors:

Gal Elidan
Kristian Kersting

ISBN: 978-1-5108-4779-8
# Conference Program

All the conference talks will be held in **Room C4.8** on the fourth level of the Sydney International Convention Centre. Poster sessions and coffee breaks will be located in Room C4.9.

**Saturday August 12th**

8:30 Welcome

**Keynote Talk**

8:40 Intelligent Robots in an Uncertain World  
*Leslie Pack Kaelbling, MIT*

**Session 1: Deep Models**

9:40 48: Inverse Reinforcement Learning via Deep Gaussian Process  
*Ming Jin, Andreas Damianou, Pieter Abbeel, Costas Spanos*

10:00 267: Holographic Feature Representations of Deep Networks  
*Martin A. Zinkevich, Alex Davies, Dale Schuurmans*

10:20 173: Computing Nonvacuous Generalization Bounds for Deep (Stochastic) Neural Networks with Many More Parameters than Training Data  
*Gintare Karolina Dziugaite and Daniel M. Roy*

10:40 - 11:10 Coffee break

**Session 2: Machine Learning**

11:10 32: Provable Inductive Robust PCA via Iterative Hard Thresholding  
*U.N. Niranjan, Arun Rajkumar, Theja Tulabandhula*

11:30 6: Near-Orthogonality Regularization in Kernel Methods  
*Pengtao Xie, Barnabas Poczos, Eric Xing*

*Ashish Sabharwal and Hanie Sedghi*

12:10 - 14:00 Lunch break

**Keynote Talk**

14:00 Learning and Inference with Expectations  
*Amir Globerson, University of Tel Aviv*
Session 3: Inference

15:00 160: On Loopy Belief Propagation – Local Stability Analysis for Non-Vanishing Fields 100
Christian Knoll and Franz Pernkopf

15:20 259: Improving Optimization-Based Approximate Inference by Clamping Variables 110
Junyao Zhao, Josip Djolonga, Sebastian Tschiatschek, Andreas Krause

15:40 109: Approximation Complexity of Maximum A Posteriori Inference in Sum-Product Networks 124
Diarmaid Conaty, Cassio P. de Campos, Denis D. Maua

16:00 - 16:20 Coffee break

Session 4: Learning

16:20 291: Learning the Structure of Probabilistic Sentential Decision Diagrams 134
Yitao Liang, Jessa Bekker, Guy Van den Broeck

16:40 278: A Probabilistic Framework for Multi-Label Learning with Unseen Labels 146
Abhilash Gaure and Piyush Rai

17:00 297: Hybrid Deep Discriminative/Generative Models for Semi-Supervised Learning 156
Volodymyr Kuleshov and Stefano Ermon

Poster Spotlights 1

17:20 - 17:50 one minute poster spotlight presentations of papers:

100: Regret Minimization Algorithms for the Followers Behaviour Identification in Leadership Games 166
Lorenzo Bisi, Giuseppe De Nittis, Francesco Trovò, Marcello Restelli, Nicola Gatti

105: On the Complexity of Nash Equilibrium Reoptimization 183
Andrea Celli, Alberto Marchesi, Nicola Gatti

26: Shortest Path under Uncertainty: Exploration versus Exploitation 193
Zhan Wei Lim, David Hsu, Wee Sun Lee

35: Learning with Confident Examples: Rank Pruning for Robust Classification with Noisy Labels 203
Curtis G. Northcutt, Tailin Wu, Isaac L. Chuang

37: Monte-Carlo Tree Search using Batch Value of Perfect Information 228
Shahaf S. Shperberg, Solomon Eyal Shimony, Ariel Felner

45: Submodular Variational Inference for Network Reconstruction 238
Lin Chen, Forrest W. Crawford, Amin Karbasi

70: Bayesian Inference of Log Determinants 253
J. Fitzsimons, K. Cutajar, M. Filippone, M. Osborne, S. Roberts

75: Fast Amortized Inference and Learning in Log-linear Models with Randomly Perturbed Nearest Neighbor Search 264
Stephen Mussmann, Daniel Levy, Stefano Ermon
106: Supervised Restricted Boltzmann Machines 279
Tu Dinh Nguyen, Dinh Phung, Viet Huynh, Trung Le

108: Safe Semi-Supervised Learning of Sum-Product Networks 289
Martin Trapp, Tamas Madl, Robert Peharz, Franz Pernkopf, Robert Trappl

142: Green Generative Modeling: Recycling Dirty Data using Recurrent Variational Autoencoders 299
Yu Wang, Bin Dai, Gang Hua, John Aston, David Wipf

146: Approximate Evidential Reasoning Using Local Conditioning and Conditional Belief Functions 322
Van Nguyen

152: Differentially Private Variational Inference for Non-conjugate Models 332
Joonas Jälkö, Antti Honkela, Onur Dikmen

162: Value Directed Exploration in Multi-Armed Bandits with Structured Priors 342
Bence Cserna, Marek Petrik, Reazul Hasan Russel, Wheeler Ruml

188: Learning Approximately Objective Priors 355
Eric Nalisnick and Padhraic Smyth

206: Learning to Draw Samples with Amortized Stein Variational Gradient Descent 365
Yihao Feng, Dilin Wang, Qiang Liu

220: A Tractable Probabilistic Model for Subset Selection 377
Yujia Shen, Arthur Choi, Adnan Darwiche

229: Structure Learning of Linear Gaussian Structural Equation Models with Weak Edges 391
Marco Eigenmann, Preetam Nandy, Marloes Maathuis

234: SAT-Based Causal Discovery under Weaker Assumptions 409
Zhalama, Ji Ji Zhang, Frederick Eberhardt, Wolfgang Mayer

237: Learning to Acquire Information 419
Yewen Pu, Leslie Pack Kaelbling, Armando Solar-Lezama

17:50 - 19:50 Poster Session 1
Will include all papers presented on Saturday.
Sunday August 13th

Keynote Talk
8:30  Snorkel: Beyond Hand-labeled Data  
  *Christopher Ré, Stanford*

Session 5: Representations
9:30  263: Why Rules are Complex: Real-Valued Probabilistic Logic Programs are not Fully Expressive  
  *David Buchman and David Poole*
9:50  292: Interpreting Lion Behaviour as Probabilistic Programs  
  *Neil Dhir, Matthijs Vakar, Matthew Wijers, Andrew Markham, Frank Wood*
10:10  147: Decoupling Homophily and Reciprocity with Latent Space Network Models  
  *Jiasen Yang, Vinayak Rao, Jennifer Neville*

10:30 - 11:00 Coffee break

Session 6: Reinforcement Learning
11:00  276: Online Constrained Model-based Reinforcement Learning  
  *Benjamin van Niekerk, Andreas Damianou, Benjamin Rosman*
11:20  209: A Reinforcement Learning Approach to Weaning of Mechanical Ventilation in Intensive Care Units  
  *Niranjani Prasad, Li-Fang Cheng, Corey Chivers, Michael Draugelis, Barbara E. Engelhardt*
11:40  62: Near-Optimal Interdiction of Factored MDPs  
  *Swetasudha Panda and Yevgeniy Vorobeychik*
12:00  225: Importance Sampling for Fair Policy Selection  
  *Shayan Doroudi, Philip Thomas, Emma Brusnkill*

12:20 - 14:10 Lunch break

Keynote Talk
14:10 - 15:10  Machine Learning for Healthcare Data  
  *Katherine Heller, Duke University*

Poster Spotlights 2
15:10pm - 15:40 one minute poster spotlight presentations of papers:
12:  FROSH: FasteR Online Sketching Hashing  
  *Xixian Chen, Irwin King, Michael R. Lyu*
16:  Self-Discrepancy Conditional Independence Test  
  *Sanghack Lee and Vasant Honavar*
15:40 - 16:00 Coffee break

16:00 - 18:00 Poster Session 2

Will include all papers presented on Sunday.

18:45 - Banquet Boarding

Banquet Talk: 15 minutes on Artificial Intelligence and Statistical Models

Terry Speed, Walter and Eliza Hall Institute of Medical Research
Monday August 14th

Keynote Talk
8:30 Two current analysis challenges: Single Cell Omics and Nanopore Long-read Sequence Data
Terry Speed, Walter and Eliza Hall Institute of Medical Research

Session 7: Causality
9:30 266: Learning Treatment-Response Models from Multivariate Longitudinal Data
Hossein Soleimani, Adarsh Subbaswamy, Suchi Saria

9:50 120: Interpreting and Using CPDAGs With Background Knowledge
Emilija Perkovic, Markus Kalisch, Marloes H. Maathuis

10:10 11: Causal Consistency of Structural Equation Models
Paul K. Rubenstein, Sebastian Weichwald, Stephan Bongers, Joris M. Mooij, Dominik Janzing, Moritz Grosse-Wentrup, Bernhard Schölkopf

10:30 - 11:00 Coffee break

Session 8: Sampling
11:00 217: Stein Variational Adaptive Importance Sampling
Jun Han, Qiang Liu

11:20 289: Continuously Tempered Hamiltonian Monte Carlo
Matthew M. Graham, Amos J. Storkey

11:40 69: Balanced Mini-batch Sampling for SGD Using Determinantal Point Processes
Cheng Zhang, Hedvig Kjellstrom, Stephan Mandt

12:00 54: An Efficient Minibatch Acceptance Test for Metropolis-Hastings
Daniel Seita, Xindei Pan, Haoyu Chen, John Canny

12:20 - 14:10 Lunch break

Session 9: Bandits
14:10 137: Stochastic Bandit Models for Delayed Conversions
Claire Vernade, Olivier Cappé, Vianney Perchet

14:30 171: A Practical Method for Solving Contextual Bandit Problems Using Decision Trees
Ryan McNellis, Adam N. Elmachtoub, Sechan Oh, Marek Petrik

14:50 180: Analysis of Thompson Sampling for Stochastic Sleeping Bandits
Aritra Chatterjee, Ganesh Ghalme, Shweta Jain, Rohit Vaish, Y. Narahari
15:10 - 15:40 one minute poster spotlight presentations of papers:

56: The Total Belief Theorem  
*Chunlai Zhou, Fabio Cuzzolin*

64: Complexity of Solving Decision Trees with Skew-Symmetric Bilinear Utility  
*Hugo Gilbert, Olivier Spanjaard*

72: Stochastic Segmentation Trees for Multiple Ground Truths  
*Jake Snell and Richard S. Zemel*

83: Efficient Online Learning for Optimizing Value of Information: Theory and Application to Interactive Troubleshooting  
*Yuxin Chen, Jean-Michel Renders, Morteza Haghir Chehreghani, Andreas Krause*

97: Counting Markov Equivalence Classes by Number of Immoralities  
*Adityanarayanan Radhakrishnan, Liam Solus, Caroline Uhler*

130: Real-Time Resource Allocation for Tracking Systems  
*Yash Satsangi, Shimon Whiteson, Frans Oliehoek, Henri Bouma*

134: Synthesis of Strategies in Influence Diagrams  
*Manuel Luque, Manuel Arias, Francisco Javier Díez*

135: Embedding Senses via Dictionary Bootstrapping  
*Byungkon Kang, Kyung-Ah Sohn*

138: Importance Sampled Stochastic Optimization for Variational Inference  
*Joseph Sakaya, Arto Klami*

155: Multi-dueling Bandits with Dependent Arms  
*Yanan Sui, Vincent Zhuang, Joel W. Burdick, Yisong Yue*

185: Convex-constrained Sparse Additive Modeling and Its Extensions  
*Junming Yin, Yaoliang Yu*

239: Stein Variational Policy Gradient  
*Yang Liu, Prajit Ramachandran, Qiang Liu, Jian Peng*

269: Causal Discovery from Temporally Aggregated Time Series  
*Mingming Gong, Kun Zhang, Bernhard Schölkopf, Clark Glymour, Dacheng Tao*

280: Efficient solutions for Stochastic Shortest Path Problems with Dead Ends  
*Felipe Trevizan, Florent Teichteil-Knigsbuch, Sylvie Thiebaux*

281: Probabilistic Program Abstractions  
*Steven Holtzen, Todd Millstein, Guy Van den Broeck*

286: Communication-Efficient Distributed Primal-Dual Algorithm for Saddle Point Problem  
*Yaodong Yu, Sulin Liu, Sinno Jialin Pan*

298: Robust Model Equivalence using Stochastic Bisimulation for N-Agent Interactive DIDs  
*Muthukumaran Chandrasekaran, Junhuan Zhang, Prashant Doshi, Yifeng Zeng*

306: Adversarial Sets for Regularising Neural Link Predictors  
*Pasquale Minervini, Thomas Demeester, Tim Rocktäschel, Sebastian Riedel*