

# **39th Conference on Uncertainty in Artificial Intelligence (UAI 2023)**

Proceedings of Machine Learning Research Volume 216

Pittsburgh, Pennsylvania, USA  
31 July - 4 August 2023

Part 1 of 4

ISBN: 978-1-7138-7806-3

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2023) by Association For Uncertainty in Artificial Intelligence (AUAI)  
All rights reserved.

Printed by Curran Associates, Inc. (2024)

For permission requests, please contact Association For Uncertainty in Artificial Intelligence (AUAI)  
at the address below.

Association For Uncertainty in Artificial Intelligence (AUAI)  
Department of Computer Science  
University of British Columbia  
Vancouver BC Canada V6T 1Z4

Phone: (703) 787-8044  
Fax: (703) 478-0829

[www.auai.org](http://www.auai.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

## PART 1

SubMix: Learning to Mix Graph Sampling Heuristics..... <i>S. Abu-El-Haija, J.V. Dillon, B. Fatemi, K. Axiotis, N. Bulut, J. Gasteiger, B. Perozzi, M. Batani</i>	1
Guided Deep Kernel Learning..... <i>I. Achituve, G. Chechik, E. Fetaya</i>	11
Bounding the Optimal Value Function in Compositional Reinforcement Learning..... <i>J. Adamczyk, V. Makarenko, A. Arriolas, S. Tiomkin, R.V. Kulkarni</i>	22
A Decoder Suffices for Query-Adaptive Variational Inference .....	33
<i>S. Agarwal, G. Hope, A. Younis, E.B. Sudderth</i>	
FLASH: Automating Federated Learning Using CASH .....	45
<i>M.I.I. Alam, K. Kar, T. Salonidis, H. Samulowitz</i>	
Transfer Learning for Individual Treatment Effect Estimation .....	56
<i>A. Aloui, J. Dong, C.P. Le, V. Tarokh</i>	
Robust Gaussian Process Regression with the Trimmed Marginal Likelihood .....	67
<i>D. Andrade, A. Takeda</i>	
Two Sides of Miscalibration: Identifying Over and Under-Confidence Prediction for Network Calibration..... <i>S. Ao, S. Rueger, A. Siddharthan</i>	77
Quantifying Lottery Tickets Under Label Noise: Accuracy, Calibration, and Complexity .....	88
<i>V. Arora, D. Irto, S. Goldt, G. Sanguinetti</i>	
Bayesian Inference Approach for Entropy Regularized Reinforcement Learning with Stochastic Dynamics..... <i>A. Arriolas, J. Adamczyk, S. Tiomkin, R.V. Kulkarni</i>	99
Neural Tangent Kernel at Initialization: LinearWidth Suffices .....	110
<i>A. Banerjee, P. Cisneros-Velarde, L. Zhu, M. Belkin</i>	
Do We Become Wiser with Time? on Causal Equivalence with Tiered Background Knowledge .....	119
<i>C.W. Bang, V. Didelez</i>	
Sample Boosting Algorithm (SamBA) - An Interpretable Greedy Ensemble Classifier Based on Local Expertise for Fat Data..... <i>B. Bauvin, C. Capponi, F. Clerc, P. Germain, S. Koco, J. Corbeil</i>	130
Learning Choice Functions with Gaussian Processes..... <i>A. Benavoli, D. Azzimonti, D. Piga</i>	141
Inference of a Rumor's Source in the Independent Cascade Model..... <i>P. Berenbrink, M. Hahn-Klimroth, D. Kaaser, L. Krieg, M. Rau</i>	152

Best Arm Identification in Rare Events .....	163
<i>A. Bhattacharjee, S. Vijayan, S. Juneja</i>	
BeliefPPG: Uncertainty-Aware Heart Rate Estimation from PPG Signals Via Belief Propagation .....	173
<i>V. Bieri, P. Strelci, B.U. Demirel, C. Holz</i>	
Amortized Inference for Gaussian Process Hyperparameters of Structured Kernels .....	184
<i>M. Bitzer, M. Meister, C. Zimmer</i>	
Correcting for Selection Bias and Missing Response in Regression Using Privileged Information .....	195
<i>P. Boeken, N. de Kroon, M. de Jong, J.M. Mooij, O. Zoeter</i>	
Efficient Learning of Minimax Risk Classifiers in High Dimensions.....	206
<i>K. Bondugula, S. Mazuelas, A. Perez</i>	
Approximating Probabilistic Explanations Via Supermodular Minimization .....	216
<i>L. Bounia, F. Koriche</i>	
Inference for Mark-Censored Temporal Point Processes .....	226
<i>A. Boyd, Y. Chang, S. Mandt, P. Smyth</i>	
Testing Conventional Wisdom (of the Crowd) .....	237
<i>N. Burrell, G. Schoenebeck</i>	
Overcoming Language Priors for Visual Question Answering Via Loss Rebalancing Label and Global Context .....	249
<i>R. Cao, Z. Li</i>	
Scaling Integer Arithmetic in Probabilistic Programs .....	260
<i>W.X. Cao, P. Garg, R. Tjoa, S. Holtzen, T. Millstein, G. Van den Broeck</i>	
Human Control: Definitions and Algorithms .....	271
<i>R. Carey, T. Everitt</i>	
Scalable Nonparametric Bayesian Learning for Dynamic Velocity Fields.....	282
<i>S. Chakraborty, A. Guha, R. Lei, X.L. Nguyen</i>	
Learning in Online MDPs: Is There a Price for Handling the Communicating Case? .....	293
<i>G. Chandrasekaran, A. Tewari</i>	
Modified Retrace for Off-Policy Temporal Difference Learning .....	303
<i>X. Chen, X. Ma, Y. Li, G. Yang, S. Yang, Y. Gao</i>	
Benign Overfitting in Adversarially Robust Linear Classification.....	313
<i>J. Chen, Y. Cao, Q. Gu</i>	
An Effective Negotiating Agent Framework Based on Deep Offline Reinforcement Learning.....	324
<i>S. Chen, J. Zhao, G. Weiss, R. Su, K. Lei</i>	
MFA: Multi-Layer Feature-Aware Attack for Object Detection.....	336
<i>W. Chen, Y. Zhang, Z. Li, Y. Wang</i>	
Differential Privacy in Cooperative Multiagent Planning .....	347
<i>B. Chen, C. Hawkins, M.O. Karabag, C. Neary, M. Hale, U. Topcu</i>	
Causal InferenceWith Outcome-Dependent Missingness and Self-Censoring.....	358
<i>J.M. Chen, D. Malinsky, R. Bhattacharya</i>	

Detection of Short-Term Temporal Dependencies in Hawkes Processes with Heterogeneous Background Dynamics .....	369
<i>Y. Chen, F. Li, A. Schneider, Y. Nevmyvaka, A. Amarasingham, H. Lam</i>	
Enhancing Treatment Effect Estimation: A Model Robust Approach Integrating Randomized Experiments and External Controls Using the Double Penalty Integration Estimator .....	381
<i>Y. Cheng, L. Wu, S. Yang</i>	
Adaptivity Complexity for Causal Graph Discovery .....	391
<i>D. Choo, K. Shiragur</i>	
Combinatorial Categorized Bandits with Expert Rankings .....	403
<i>S.R. Chowdhurry, G. Sinha, N. Natarajan, A. Sharma</i>	
Parity Calibration .....	413
<i>Y. Chung, A. Rumack, C. Gupta</i>	
Finite-Sample Guarantees for Nash Q-Learning with Linear Function Approximation.....	424
<i>P. Cisneros-Velarde, S. Koyejo</i>	
Establishing Markov Equivalence in Cyclic Directed Graphs .....	433
<i>T. Claassen, J.M. Mooij</i>	
Expectation Consistency for Calibration of Neural Networks .....	443
<i>L. Clarte, B. Lourelro, F. Krzakala, L. Zdeborova</i>	
Human-In-The-Loop Mixup.....	454
<i>K.M. Collins, U. Bhatt, W. Liu, V. Piratla, I. Sucholutsky, B. Love, A. Weller</i>	
Learning to Reason About Contextual Knowledge for Planning Under Uncertainty .....	465
<i>C. Cui, S. Amiri, Y. Ding, X. Zhan, S. Zhang</i>	
Blackbox Optimization of Unimodal Functions.....	476
<i>A. Cutkosky, A. Das, W. Kong, C. Lee, R. Sen</i>	
Conditional Abstraction Trees for Sample-Efficient Reinforcement Learning.....	485
<i>M. Dadvar, R.K. Nayyar, S. Srivastava</i>	
Improveable Gap Balancing for Multi-Task Learning .....	496
<i>Y. Dai, N. Fei, Z. Lu</i>	
CrysMMNet: Multimodal Representation for Crystal Property Prediction.....	507
<i>K. Das, P. Goyal, S.C. Lee, S. Bhattacharjee, N. Ganguly</i>	
Dirichlet Proportions Model for Hierarchically Coherent Probabilistic Forecasting .....	518
<i>A. Das, W. Kong, B. Paria, R. Sen</i>	
Neural Probabilistic Logic Programming in Discrete-Continuous Domains.....	529
<i>L. De Smet, P.Z. Dos Martires, R. Manhaeve, G. Marra, A. Kimmig, L. De Raedt</i>	
Studying the Effect of GNN Spatial Convolutions on the Embedding Space's Geometry.....	539
<i>C. Donnat, S.W. Jeong</i>	
Deep Gaussian Mixture Ensembles .....	549
<i>Y. El-Laham, N. Dalmasso, E. Fons, S. Vyetrenko</i>	

Personalized Federated Domain Adaptation for Item-To-Item Recommendation.....	560
<i>Z. Fan, H. Ding, A. Deoras, T.N. Hoang</i>	
Generating Synthetic Datasets by Interpolating Along Generalized Geodesics .....	571
<i>J. Fan, D. Alvarez-Melis</i>	
Logit-Based Ensemble Distribution Distillation for Robust Autoregressive Sequence Uncertainties.....	582
<i>Y. Fathullah, G. Xia, M.J.F. Gales</i>	
On the Role of Model Uncertainties in Bayesian Optimization .....	592
<i>J. Foldager, M. Jordahn, L.K. Hansen, M.R. Andersen</i>	
Does Momentum Help in Stochastic Optimization? a Sample Complexity Analysis .....	602
<i>S. Ganesh, R. Deb, G. Thoppe, A. Budhiraja</i>	
Time-Conditioned Generative Modeling of Object-Centric Representations for Video Decomposition and Prediction.....	613
<i>C. Gao, B. Li</i>	
Information Theoretic Clustering Via Divergence Maximization Among Clusters.....	624
<i>S. Garg, M. Dalirrooyfard, A. Schneider, Y. Adler, Y. Nevmyvaka, Y. Chen, F. Li, G. Cecchi</i>	
In- Or Out-Of-Distribution Detection Via Dual Divergence Estimation .....	635
<i>S. Garg, S. Dutta, M. Dalirrooyfard, A. Schneider, Y. Nevmyvaka</i>	
A Data-Driven State Aggregation Approach for Dynamic Discrete Choice Models .....	647
<i>S. Geng, H. Nassif, C.A. Manzanares</i>	
Quasi-Bayesian Nonparametric Density Estimation Via Autoregressive Predictive Updates .....	658
<i>S. Ghalebikesabi, C. Holmes, E. Fong, B. Lehmann</i>	

## PART 2

Copula-Based Deep Survival Models for Dependent Censoring.....	669
<i>A.H.G. Foomani, M. Cooper, R. Greiner, R.G. Krishnan</i>	
Probabilistically Robust Conformal Prediction .....	681
<i>S. Ghosh, Y. Shi, T. Belkhouja, Y. Yan, J.R. Doppa, B. Jones</i>	
Fast and Scalable Score-Based Kernel Calibration Tests .....	691
<i>P. Glaser, D. Widmann, F. Lindsten, A. Gretton</i>	
Vacant Holes for Unsupervised Detection of the Outliers in Compact Latent Representation.....	701
<i>M. Glazunov, A. Zarras</i>	
Piecewise Deterministic Markov Processes for Bayesian Neural Networks .....	712
<i>E. Goan, D. Perrin, K. Mengersen, C. Fookes</i>	
A Scalable Walsh-Hadamard Regularizer to Overcome the Low-Degree Spectral Bias of Neural Networks .....	723
<i>A. Gorji, A. Amrollahi, A. Krause</i>	
Stochastic Graphical Bandits with Heavy-Tailed Rewards .....	734
<i>Y. Gou, J. Yi, L. Zhang</i>	

Concurrent Misclassification and Out-Of-Distribution Detection for Semantic Segmentation Via Energy-Based Normalizing Flow .....	745
<i>D. Gudovskiy, T. Okuno, Y. Nakata</i>	
Functional Causal Bayesian Optimization.....	756
<i>L. Gultchin, V. Aglietti, A. Bellot, S. Chiappa</i>	
Causal Discovery for Time Series from Multiple Datasets with Latent Contexts .....	766
<i>W. Gunther, U. Ninad, J. Runge</i>	
Sufficient Identification Conditions and Semiparametric Estimation Under Missing Not at Random Mechanisms.....	777
<i>A. Guo, J. Zhao, R. Nabi</i>	
Interpretable Differencing of Machine Learning Models .....	788
<i>S. Haldar, D. Saha, D. Wei, R. Nair, E.M. Daly</i>	
Differentiable User Models .....	798
<i>A. Hamalainen, M.M. Celikok, S. Kaski</i>	
On the Convergence of Continual Learning with Adaptive Methods.....	809
<i>S. Han, Y. Kim, T. Cho, J. Lee</i>	
Revisiting Bayesian Network Learning with Small Vertex Cover.....	819
<i>J. Harvaiainen, M. Koivisto</i>	
On Inference and Learning with Probabilistic Generating Circuits.....	829
<i>J. Harvaiainen, V.P. Ramaswamy, M. Koivisto</i>	
Inference and Sampling of Point Processes from Diffusion Excursions .....	839
<i>A. Hasan, Y. Chen, Y. Ng, M. Abdelghani, A. Schneider, V. Tarokh</i>	
Loosely Consistent Emphatic Temporal-Difference Learning .....	849
<i>J. He, F. Che, Y. Wan, A.R. Mahmood</i>	
Scalable and Robust Tensor Ring Decomposition for Large-Scale Data.....	860
<i>Y. He, G.K. Atia</i>	
Massively Parallel ReweightedWake-Sleep .....	870
<i>T. Heap, G. Leech, L. Aitchison</i>	
Increasing Effect Sizes of Pairwise Conditional Independence Tests Between Random Vectors .....	879
<i>T. Hochsprung, J. Wahl, A. Gerhardus, U. Ninad, J. Runge</i>	
Optimistic Thompson Sampling-Based Algorithms for Episodic Reinforcement Learning.....	890
<i>B. Hu, T.H. Zhang, N. Hegde, M. Schmidt</i>	
ASTRA: Understanding the Practical Impact of Robustness for Probabilistic Programs .....	900
<i>Z. Huang, S. Dutta, S. Misailovic</i>	
A Near-Optimal High-Probability Swap-Regret Upper Bound for Multi-Agent Bandits in Unknown General-Sum Games.....	911
<i>Z. Huang, J. Pan</i>	
Posterior Sampling-Based Online Learning for the Stochastic Shortest Path Model.....	922
<i>M. Jafarnia-Jahromi, L. Chen, R. Jain, H. Luo</i>	

Investigating a Generalization of Probabilistic Material Implication and Bayesian Conditionals .....	932
<i>M. Jahn, M. Scheutz</i>	
Robust Statistical Comparison of Random Variables with Locally Varying Scale of Measurement.....	941
<i>C. Jansen, G. Schollmeyer, H. Blocher, J. Rodemann, T. Augustin</i>	
Noisy Adversarial Representation Learning for Effective and Efficient Image Obfuscation .....	953
<i>J. Jeong, M. Cho, P. Benz, T.H. Kim</i>	
Incentivising Diffusion While Preserving Differential Privacy .....	963
<i>F. Jia, M. Zhang, J. Liu, B. Khoussainov</i>	
Content Sharing Design for SocialWelfare in Networked Disclosure Game.....	973
<i>F. Jia, C. Qiu, S. Rajtmajer, A. Squicciarini</i>	
Multi-View Graph Contrastive Learning for Solving Vehicle Routing Problems .....	984
<i>Y. Jiang, Z. Cao, Y. Wu, J. Zhang</i>	
Bayesian Inference for Vertex-Series-Parallel Partial Orders.....	995
<i>C. Jiang, G.K. Nicholls, J.E. Lee</i>	
Nyström M-Hilbert-Schmidt Independence Criterion.....	1005
<i>F. Kalinke, Z. Szabo</i>	
Causal Discovery with Hidden Confounders Using the Algorithmic Markov Condition.....	1016
<i>D. Kaltenpoth, J. Vreeken</i>	
Heavy-Tailed Linear Bandit with Huber Regression.....	1027
<i>M. Kang, G.S. Kim</i>	
Fed-LAMB: Layer-Wise and Dimension-Wise Locally Adaptive Federated Learning.....	1037
<i>B. Karimi, P. Li, X. Li</i>	
Assessing the Impact of Context Inference Error and Partial Observability on RL Methods for Just-In-Time Adaptive Interventions.....	1047
<i>K. Karine, P. Klasnja, S.A. Murphy, B.M. Marlin</i>	
How to Use Dropout Correctly on Residual Networks with Batch Normalization .....	1058
<i>B.J. Kim, H. Choi, H. Jang, D. Lee, S.W. Kim</i>	
Phase-Shifted Adversarial Training.....	1068
<i>Y. Kim, S. Kim, I. Seo, B. Shin</i>	
On Identifiability of Conditional Causal Effects .....	1078
<i>Y. Kivva, J. Etesami, N. Kiyavash</i>	
Causal Effect Estimation from Observational and Interventional Data Through MatrixWeighted Linear Estimators .....	1087
<i>K.R. Kladny, J. von Kugelgen, B. Scholkopf, M. Muehlebach</i>	
Universal Graph Contrastive Learning with a Novel Laplacian Perturbation .....	1098
<i>T. Ko, Y. Choi, C.K. Kim</i>	
Molecule Design by Latent Space Energy-Based Modeling and Gradual Distribution Shifting.....	1109
<i>D. Kong, B. Pang, T. Han, Y.N. Wu</i>	

Reward-Machine-Guided, Self-Paced Reinforcement Learning .....	1121
<i>C. Koprulu, U. Topcu</i>	
Risk-Aware Curriculum Generation for Heavy-Tailed Task Distributions.....	1132
<i>C. Koprulu, T.D. Simao, N. Jansen, U. Topcu</i>	
Differentially Private Synthetic Data Using KD-Trees .....	1143
<i>E. Kreacic, N. Nouri, V.K. Potluru, T. Balch, M. Veloso</i>	
Optimal Budget Allocation for Crowdsourcing Labels for Graphs .....	1154
<i>A. Kulkarni, M. Chakraborty, S. Xie, Q. Li</i>	
Fixed-Budget Best-Arm Identification with Heterogeneous Reward Variances .....	1164
<i>A. Lalitha, K. Kalantari, Y. Ma, A. Deoras, B. Kveton</i>	
Variable Importance Matching for Causal Inference .....	1174
<i>Q. Lanners, H. Parikh, A. Volfovsky, C. Rudin, D. Page</i>	
Towards Better Certified Segmentation Via Diffusion Models .....	1185
<i>O. Laousy, A. Araujo, G. Chassagnon, M.P. Revel, S. Garg, F. Khorrami, M. Vakalopoulou</i>	
Finding Invariant Predictors Efficiently Via Causal Structure .....	1196
<i>K. Lee, M.M. Rahman, M. Kocaoglu</i>	
When Are Post-Hoc Conceptual Explanations Identifiable? .....	1207
<i>T. Leemann, M. Kirchhof, Y. Rong, E. Kasneci, G. Kasneci</i>	
Memory Mechanism for Unsupervised Anomaly Detection .....	1219
<i>J. Li, Y. Chen, Y. Xing</i>	
Nonconvex Stochastic Scaled Gradient Descent and Generalized Eigenvector Problems .....	1230
<i>C.J. Li, M.I. Jordan</i>	
Gaussian Process Surrogate Models for Neural Networks .....	1241
<i>M.Y. Li, E. Grant, T.L. Griffiths</i>	
CUE: An Uncertainty Interpretation Framework for Text Classifiers Built on Pre-Trained Language Models.....	1253
<i>J. Li, Z. Sun, B. Liang, L. Gui, Y. He</i>	
BISCUIT: Causal Representation Learning from Binary Interactions .....	1263
<i>P. Lippe, S. Magliacane, S. Lowe, Y.M. Asano, T. Cohen, E. Gavves</i>	
Accelerating Voting by Quantum Computation.....	1274
<i>A. Liu, Q. Han, L. Xia, N. Yu</i>	
Residual-Based Error Bound for Physics-Informed Neural Networks .....	1284
<i>S. Liu, X. Huang, P. Protopapas</i>	
No-Regret Linear Bandits Beyond Realizability .....	1294
<i>C. Liu, M. Yin, Y.X. Wang</i>	
Benefits of Monotonicity in Safe Exploration with Gaussian Processes.....	1304
<i>A. Losalka, J. Scarlett</i>	
Practical Privacy-Preserving Gaussian Process Regression Via Secret Sharing.....	1315
<i>J. Luo, Y. Zhang, J. Zhang, S. Qin, H. Wang, Y. Yu, Z. Xu</i>	

## PART 3

DeepGD3: Unknown-Aware Deep Generative/Discriminative Hybrid Defect .....	1326
<i>C.W. Ma, Y. Liu</i>	
Federated Learning of Models Pre-Trained on Different Features with Consensus Graphs.....	1336
<i>T. Ma, T.N. Hoang, J. Chen</i>	
Random Reshuffling with Variance Reduction: New Analysis and Better Rates .....	1347
<i>G. Malinovsky, A. Sailanbayev, P. Richtarik</i>	
The Shrinkage-Delinkage Trade-Off: An Analysis of Factorized Gaussian Approximations for Variational Inference .....	1358
<i>C.C. Margossian, L.K. Saul</i>	
Partial Identification of Dose Responses with Hidden Confounders.....	1368
<i>M.G. Marmarelis, E. Haddad, A. Jesson, N. Jahanshad, A. Galstyan, G.V. Steeg</i>	
Knowledge Intensive Learning of Cutset Networks.....	1380
<i>S. Mathur, V. Gogate, S. Natarajan</i>	
TCE: A Test-Based Approach to Measuring Calibration Error.....	1390
<i>T. Matsubara, N. Tax, R. Mudd, I. Guy</i>	
Causal Information Splitting: Engineering Proxy Features for Robustness to Distribution Shifts.....	1401
<i>B. Mazaheri, A. Mastakouri, D. Janzing, M. Hardt</i>	
KrADagrad: Kronecker Approximation-Domination Gradient Preconditioned Stochastic Optimization.....	1412
<i>J. Mei, A. Moreno, L. Walters</i>	
On the Relation Between Policy Improvement and Off-Policy Minimum-Variance Policy Evaluation.....	1423
<i>A.M. Metelli, S. Meta, M. Restelli</i>	
On Minimizing the Impact of Dataset Shifts on Actionable Explanations .....	1434
<i>A.P. Meyer, D. Ley, S. Srinivas, H. Lakkaraju</i>	
Adaptive Conditional Quantile Neural Processes.....	1445
<i>P. Mohseni, N. Duffield, B. Mallick, A. Hasanzadeh</i>	
Composing Efficient, Robust Tests for Policy Selection .....	1456
<i>D. Morrill, T.J. Walsh, D. Hernandez, P.R. Wurman, P. Stone</i>	
On Testability and Goodness of Fit Tests in Missing Data Models .....	1467
<i>R. Nabi, R. Bhattacharya</i>	
Active Metric Learning and Classification Using Similarity Queries .....	1478
<i>N. Nadagouda, A. Xu, M.A. Davenport</i>	
Two-Phase Attacks in Security Games .....	1489
<i>A. Nagorko, P. Ciosmak, T. Michalak</i>	
Keep-Alive Caching for the Hawkes Process.....	1499
<i>S. Narayana, I.A. Kash</i>	

Simple Transferability Estimation for Regression Tasks .....	1510
<i>C.N. Nguyen, P. Tran, L.S.T. Ho, V. Dinh, A.T. Tran, T. Hassner, C.V. Nguyen</i>	
Probabilistic Multi-Dimensional Classification.....	1522
<i>V.L. Nguyen, Y. Yang, C. de Campos</i>	
Efficient Failure Pattern Identification of Predictive Algorithms .....	1534
<i>B. Nguyen, V.A. Nguyen</i>	
Size-Constrained k-Submodular Maximization in Near-Linear Time .....	1545
<i>G. Nie, Y. Zhu, Y.Y. Nadew, S. Basu, A. Pavan, C.J. Quinn</i>	
An Improved Variational Approximate Posterior for the Deep Wishart Process .....	1555
<i>S.W. Ober, B. Anson, E. Milsom, L. Aitchison</i>	
Incentivizing Honest Performative Predictions with Proper Scoring Rules .....	1564
<i>C. Oesterheld, J. Treutlein, E. Cooper, R. Hudson</i>	
Graph Classification Gaussian Processes Via Spectral Features .....	1575
<i>F.L. Opolka, Y.C. Zhi, P. Lio, X. Dong</i>	
Approximate Thompson Sampling Via Epistemic Neural Networks .....	1586
<i>I. Osband, Z. Wen, S.M. Asghari, V. Dwaracherla, M. Ibrahimi, X. Lu, B. Van Roy</i>	
Structure-Aware Robustness Certificates for Graph Classification .....	1596
<i>P. Osselin, H. Kenlay, X. Dong</i>	
Bayesian Numerical Integration with Neural Networks.....	1606
<i>K. Ott, M. Tiemann, P. Hennig, F.X. Briol</i>	
Maximizing Submodular Functions Under Submodular Constraints .....	1618
<i>M.R. Padmanabhan, Y. Zhu, S. Basu, A. Pavan</i>	
Stochastic Generative Flow Networks.....	1628
<i>L. Pan, D. Zhang, M. Jain, L. Huang, Y. Bengio</i>	
Multi-View Independent Component Analysis with Shared and Individual Sources .....	1639
<i>T. Pandeva, P. Forre</i>	
Copula for Instance-Wise Feature Selection and Ranking .....	1651
<i>H. Peng, G. Fang, P. Li</i>	
Boosting AND/OR-Based Computational Protein Design: Dynamic Heuristics and Generalizable UFO .....	1662
<i>B. Pezeshki, R. Marinescu, A. Ihler, R. Dechter</i>	
Exact Count of Boundary Pieces of ReLU Classifiers: Towards the Proper Complexity Measure for Classification .....	1673
<i>P. Piwek, A. Klukowski, T. Hu</i>	
Split, Count, and Share: A Differentially Private Set Intersection Cardinality Estimation Protocol .....	1684
<i>M. Purcell, Y. Li, K.S. Ng</i>	
JANA: Jointly Amortized Neural Approximation of Complex Bayesian Models .....	1695
<i>S.T. Radev, M. Schmitt, V. Pratz, U. Picchini, U. Kothe, P.C. Burkner</i>	

USIM-DAL: Uncertainty-Aware Statistical Image Modeling-Based Dense Active Learning for Super-Resolution .....	1707
<i>V. Rangnekar, U. Upadhyay, Z. Akata, B. Banerjee</i>	
Contrastive Learning for Supervised Graph Matching.....	1718
<i>G. Ratnayaka, Q. Wang, Y. Li</i>	
Validation of Composite Systems by Discrepancy Propagation.....	1730
<i>D. Reeb, K. Patel, K. Barsim, M. Schiegg, S. Gerwinn</i>	
Inference for Probabilistic Dependency Graphs .....	1741
<i>O.E. Richardson, J.Y. Halpern, C. De Sa</i>	
The Past Does Matter: Correlation of Subsequent States in Trajectory Predictions of Gaussian Process Models.....	1752
<i>S. Ridderbusch, S. Ober-Blobaum, P. Goulart</i>	
Approximately Bayes-Optimal Pseudo-Label Selection .....	1762
<i>J. Rodemann, J. Goschenhofer, E. Dorigatti, T. Nagler, T. Augustin</i>	
Hallucinated Adversarial Control for Conservative Offline Policy Evaluation.....	1774
<i>J. Rothfuss, B. Sukhija, T. Birchler, P. Kassraei, A. Krause</i>	
Semi-Supervised Learning of Partial Differential Operators and Dynamical Flows.....	1785
<i>M. Rotman, A. Dekel, R.I. Ber, L. Wolf, Y. Oz</i>	
Is the Volume of a Credal Set a Good Measure for Epistemic Uncertainty?.....	1795
<i>Y. Sale, M. Caprio, E. Hullermeier</i>	
Heteroskedastic Geospatial Tracking with Distributed Camera Networks.....	1805
<i>C. Samplawski, S. Fang, Z. Wang, D. Ganesan, M. Srivastava, B.M. Marlin</i>	
Online Heavy-Tailed Change-Point Detection .....	1815
<i>A. Sankararaman, B. Narayanaswamy</i>	
Learning Good Interventions in Causal Graphs Via Covering .....	1827
<i>A. Sawarni, R. Madhavan, G. Sinha, S. Barman</i>	
Local Message Passing on Frustrated Systems.....	1837
<i>L. Schmid, J. Brenk, L. Schmalen</i>	
Lifelong Bandit Optimization: No Prior and No Regret.....	1847
<i>F. Schur, P. Kassraei, J. Rothfuss, A. Krause</i>	
Learning from Low Rank Tensor Data: A Random Tensor Theory Perspective.....	1858
<i>M.E.A. Seddik, M. Tiomoko, A. Decurninge, M. Panov, M. Guillaud</i>	
MDPose: Real-Time Multi-Person Pose Estimation Via Mixture Density Model.....	1868
<i>S. Seo, J. Yoo, J. Hwang, N. Kwak</i>	
Mnemonist: Locating Model Parameters that Memorize Training Examples .....	1879
<i>A.S. Shamsabadi, J. Hayes, B. Balle, A. Weller</i>	
Implicit Training of Inference Network Models for Structured Prediction .....	1889
<i>S. Shankar</i>	

Efficiently Learning the Graph for Semi-Supervised Learning.....	1900
<i>D. Sharma, M. Jones</i>	
Counting Background Knowledge Consistent Markov Equivalent Directed Acyclic Graphs.....	1911
<i>V.S. Sharma</i>	
SymNet 3.0: Exploiting Long-Range Influences in Learning Generalized Neural Policies for Relational MDPs .....	1921
<i>V. Sharma, D. Arora, Mausam, P. Singla</i>	
Risk-Limiting Financial Audits viaWeighted Sampling Without Replacement.....	1932
<i>S. Shekhar, Z. Xu, Z. Lipton, P. Liang, A. Ramdas</i>	
Learning Nonlinear Causal Effects Via Kernel Anchor Regression .....	1942
<i>W. Shi, W. Xu</i>	
A Bayesian Approach for Bandit Online Optimization with Switching Cost.....	1953
<i>Z. Shi, J. Tan, F.F. Li</i>	
Probabilistic Flow Circuits: Towards Unified Deep Models for Tractable Probabilistic Inference.....	1964
<i>S. Sidheekh, K. Kersting, S. Natarajan</i>	
On the Limitations of Markovian Rewards to Express Multi-Objective, Risk-Sensitive, and Modal Tasks.....	1974
<i>J. Skalse, A. Abate</i>	

## PART 4

Aligned Diffusion Schrödinger Bridges .....	1985
<i>V.R. Somnath, M.R. Martinez, M. Pariset, A. Krause, Y.P. Hsieh, C. Bunne</i>	
ViBid: Linear Vision Transformer with Bidirectional Normalization .....	1996
<i>J. Song, H.C. Lee</i>	
Fast Heterogeneous Federated Learning with Hybrid Client Selection.....	2006
<i>D. Song, G. Shen, D. Gao, I. Yang, X. Zhou, S. Pan, W. Lou, F. Zhou</i>	
Solving Multi-Model MDPs by Coordinate Ascent and Dynamic Programming .....	2016
<i>X. Su, M. Petrik</i>	
Differentially Private Stochastic Convex Optimization in (Non)-Euclidean Space Revisited .....	2026
<i>J. Su, C. Zhao, D. Wang</i>	
On the Informativeness of Supervision Signals.....	2036
<i>I. Sucholutsky, R.M. Battleday, K.M. Collins, R. Marjieh, J.C. Peterson, P. Singh, U. Bhatt, N. Jacoby, A. Weller, T.L. Griffiths</i>	
Meta-Learning Control Variates: Variance Reduction with Limited Data.....	2047
<i>Z. Sun, C.J. Oates, F.X. Briol</i>	
Pandering in a (Flexible) Representative Democracy .....	2058
<i>X. Sun, J. Masur, B. Abramowitz, N. Mattei, Z. Zheng</i>	
Locally Regularized Sparse Graph by Fast Proximal Gradient Descent .....	2069
<i>D. Sun, Y. Yang</i>	

Why Out-Of-Distribution Detection Experiments Are Not Reliable - Subtle Experimental Details Muddle the OOD Detector Rankings ..... <i>K. Szyc, T. Walkowiak, H. Maciejewski</i>	2078
Exploiting Inferential Structure in Neural Processes..... <i>D. Tailor, M.E. Khan, E. Nalisnick</i>	2089
Two-Stage Kernel Bayesian Optimization in High Dimensions ..... <i>J. Tan, N. Nayman</i>	2099
Low-Rank Matrix Recovery with Unknown Correspondence ..... <i>Z. Tang, T.H. Chang, X. Ye, H. Zha</i>	2111
Fairness-Aware Class Imbalanced Learning on Multiple Subgroups ..... <i>D.A. Tarzanagh, B. Hou, B. Tong, Q. Long, L. Shen</i>	2123
SPDF: Sparse Pre-Training and Dense Fine-Tuning for Large Language Models..... <i>V. Thangarasa, A. Gupta, W. Marshall, T. Li, K. Leong, D. DeCoste, S. Lie, S. Saxena</i>	2134
Bandits with Costly Reward Observations..... <i>A.D. Tucker, C. Biddulph, C. Wang, T. Joachims</i>	2147
Probabilistic Circuits that Know What They Don't Know ..... <i>F. Ventola, S. Braun, Z. Yu, M. Mundt, K. Kersting</i>	2157
A Policy Gradient Approach for Optimization of Smooth Risk Measures ..... <i>N. Vijayan, L.A. Prashanth</i>	2168
Birds of an Odd Feather: Guaranteed Out-Of-Distribution (OOD) Novel Category Detection ..... <i>Y. Wald, S. Saria</i>	2179
Exploration for Free: How Does Reward Heterogeneity Improve Regret in Cooperative Multi-Agent Bandits? ..... <i>X. Wang, L. Yang, Y.Z.J. Chen, X. Liu, M. Hajiesmaili, D. Towsley, J.C.S. Lui</i>	2192
Efficient Privacy-Preserving Stochastic Nonconvex Optimization..... <i>L. Wang, B. Jayaraman, D. Evans, Q. Gu</i>	2203
Diversity-Enhanced Probabilistic Ensemble for Uncertainty Estimation..... <i>H. Wang, Q. Ji</i>	2214
A Trajectory isWorth Three Sentences: Multimodal Transformer for Offline Reinforcement Learning ..... <i>Y. Wang, M. Xu, L. Shi, Y. Chi</i>	2226
Robust Distillation forWorst-Class Performance: On the Interplay Between Teacher and Student Objectives..... <i>S. Wang, H. Narasimhan, Y. Zhou, S. Hooker, M. Lukasik, A.K. Menon</i>	2237
A Constrained Bayesian Approach to Out-Of-Distribution Prediction..... <i>Z. Wang, B. Yuan, J. Lu, B. Ding, Y. Shao, Q. Wu, J. Zhu</i>	2248
On the Role of Generalization in Transferability of Adversarial Examples ..... <i>Y. Wang, F. Farnia</i>	2259
Bidirectional Attention as a Mixture of Continuous Word Experts ..... <i>K.C. Wibisono, Y. Wang</i>	2271

Quantifying Aleatoric and Epistemic Uncertainty in Machine Learning: Are Conditional Entropy and Mutual Information Appropriate Measures? .....	2282
<i>L. Wimmer, Y. Sale, P. Hofman, B. Bischl, E. Hullermeier</i>	
Learning to Invert: Simple Adaptive Attacks for Gradient Inversion in Federated Learning .....	2293
<i>R. Wu, X. Chen, C. Guo, K.Q. Weinberger</i>	
Uniform-PAC Guarantees for Model-Based RL with Bounded Eluder Dimension .....	2304
<i>Y. Wu, J. He, Q. Gu</i>	
Robust Quickest Change Detection for Unnormalized Models.....	2314
<i>S. Wu, E. Diao, T. Banerjee, J. Ding, V. Tarokh</i>	
A One-Sample Decentralized Proximal Algorithm for Non-Convex Stochastic Composite Optimization.....	2324
<i>T. Xiao, X. Chen, K. Balasubramanian, S. Ghadimi</i>	
Two-Stage Holistic and Contrastive Explanation of Image Classification .....	2335
<i>W. Xie, X.H. Li, Z. Lin, L.K.M. Poon, C.C. Cao, N.L. Zhang</i>	
Conformal Risk Control for Ordinal Classification.....	2346
<i>Y. Xu, W. Guo, Z. Wei</i>	
E(2)-Equivariant Vision Transformer .....	2356
<i>R. Xu, K. Yang, K. Liu, F. He</i>	
Provably Efficient Adversarial Imitation Learning with Unknown Transitions .....	2367
<i>T. Xu, Z. Li, Y. Yu, Z.Q. Luo</i>	
Pessimistic Model Selection for Offline Deep Reinforcement Learning.....	2379
<i>C.H. Yang, Z. Qi, Y. Cui, P.Y. Chen</i>	
Mixture of Normalizing Flows for European Option Pricing.....	2390
<i>Y. Yang, T.M. Hospedales</i>	
Multi-Modal Differentiable Unsupervised Feature Selection.....	2400
<i>J. Yang, O. Lindenbaum, Y. Kluger; A. Jaffe</i>	
MMEL: A Joint Learning Framework for Multi-Mention Entity Linking.....	2411
<i>C. Yang, B. He, Y. Wu, C. Xing, L. He, C. Ma</i>	
Mitigating Transformer Overconfidence Via Lipschitz Regularization.....	2422
<i>W. Ye, Y. Ma, X. Cao, K. Tang</i>	
Towards Physically Reliable Molecular Representation Learning.....	2433
<i>S. Yi, Y. Cho, J. Sul, S.W. Ko, S.K. Kim, J. Choo, H. Yoon, J. Lee</i>	
Monte-Carlo Search for an Equilibrium in Dec-POMDPs .....	2444
<i>Y. You, V. Thomas, F. Colas, O. Buffet</i>	
Online Estimation of Similarity Matrices with Incomplete Data .....	2454
<i>F. Yu, Y. Zeng, J. Mao, W. Li</i>	
Fast Teammate Adaptation in the Presence of Sudden Policy Change .....	2465
<i>Z. Zhang, L. Yuan, L. Li, K. Xue, C. Jia, C. Guan, C. Qian, Y. Yu</i>	

Energy-Based Predictive Representations for Partially Observed Reinforcement Learning.....	2477
<i>T. Zhang, T. Ren, C. Xiao, W. Xiao, J.E. Gonzalez, D. Schuurmans, B. Dai</i>	
Provably Efficient Representation Selection in Low-Rank Markov Decision Processes: From Online to Offline RL .....	2488
<i>W. Zhang, J. He, D. Zhou, A. Zhang, Q. Gu</i>	
Graph Self-Supervised Learning Via Proximity Divergence Minimization .....	2498
<i>T. Zhang, Z. Dai, Z. Xu, A. Shrivastava</i>	
Greed is Good: Correspondence Recovery for Unlabeled Linear Regression.....	2509
<i>H. Zhang, P. Li</i>	
Conditional Counterfactual Causal Effect for Individual Attribution.....	2519
<i>R. Zhao, L. Zhang, S. Zhu, Z. Lu, Z. Dong, C. Zhang, J. Xu, Z. Geng, Y. He</i>	
Conditionally Optimistic Exploration for Cooperative Deep Multi-Agent Reinforcement Learning .....	2529
<i>X. Zhao, Y. Pan, C. Xiao, S. Chandar, J. Rajendran</i>	
RDM-DC: Poisoning Resilient Dataset Condensation with Robust Distribution Matching .....	2541
<i>T. Zheng, B. Li</i>	
Learning Robust Representation for Reinforcement Learning with Distractions by Reward Sequence Prediction .....	2551
<i>Q. Zhou, J. Wang, Q. Liu, Y. Kuang, W. Zhou, H. Li</i>	
Convergence Rates for Localized Actor-Critic in Networked Markov Potential Games .....	2563
<i>Z. Zhou, Z. Chen, Y. Lin, A. Wierman</i>	
AUC Maximization in Imbalanced Lifelong Learning.....	2574
<i>X. Zhu, J. Hao, Y. Guo, M. Liu</i>	
“Private Prediction Strikes Back!” Private Kernelized Nearest Neighbors with Individual Rényi Filter .....	2586
<i>Y. Zhu, X. Zhao, C. Guo, Y.X. Wang</i>	
MixupE: Understanding and Improving Mixup from Directional Derivative Perspective.....	2597
<i>Y. Zou, V. Verma, S. Mittal, W.H. Tang, H. Pham, J. Kannala, Y. Bengio, A. Solin, K. Kawaguchi</i>	
Regularized Online DR-Submodular Optimization.....	2608
<i>P. Zuo, Y. Wang, S. Tang</i>	
KrADagrad: Kronecker Approximation-Domination Gradient Preconditioned Stochastic Optimization.....	2618
<i>J. Mei, A. Moreno, L. Walters</i>	
KrADagrad: Kronecker Approximation-Domination Gradient Preconditioned Stochastic Optimization (Supplementary Material).....	2629
<i>J. Mei, A. Moreno, L. Walters</i>	

## Author Index