

QTML 2021 Program

All times listed are Japan Standard Time (JST)

Monday November 8 2021

9:00-9:25	Welcome
9:25-11:00	Session S1.1 (Chair: Birgitta Whaley) 9:25-10:10 Invited Talk: Sanjeev Arora , Princeton University <i>The quest to open the black box of Deep Learning</i> Contributed Talks 10:10-10:35 Daochen Wang , University of Maryland Paper 77: <i>Quantum Algorithms for Reinforcement Learning with a Generative Model</i> 10:35-11:00 Andrew Sornborger , Los Alamos National Laboratory Paper 24: <i>Universal Compiling and (No-)Free-Lunch Theorems for Continuous Variable Quantum Learning</i>
11:00-11:30	Coffee/Tea Break
11:30-13:30	Session S1.2 (Chair: Maria Kieferova) 11:30-12:15 Invited Talk: Nathan Wiebe , University of Toronto <i>Barren Plateaus and Quantum Generative Training Using Renyi Divergences</i> Contributed Talks 12:15-12:40 Francisco Javier Fernandez Alcazar , Zapata Computing Paper 37: <i>Enhancing Combinatorial Optimization with Quantum Generative Models</i> 12:40-13:05 Martin Larocca , Los Alamos National Laboratory Paper 76: <i>Diagnosing barren plateaus with tools from quantum optimal control</i> 13:05-13:30 Andrew Arrasmith , Los Alamos National Laboratory Paper 74: <i>Adaptive shot allocation for fast convergence in variational quantum algorithms</i>

13:30-14:30	Lunch Break
14:30-16:30	<p>Session S1.3 (Chair: Minh Ha Quang)</p> <p>14:30-15:15 Invited Talk: Keisuke Fujii, Osaka University <i>Quantum machine learning: quantum kernel method and beyond</i></p> <p>Contributed Talks</p> <p>15:15-15:40 Patrick Huembeli, EPFL Paper 3: <i>Exploring Quantum Perceptron and Quantum Neural Network structures with a teacher-student scheme</i></p> <p>15:40-16:05 Xinbiao Wang, Wuhan University Paper 50: <i>Towards understanding the power of quantum kernels in the NISQ era</i></p> <p>16:05-16:30 Slimane Thabet, Pasqal Paper 47: <i>Quantum evolution kernel : Machine learning on graphs with programmable arrays of qubits</i></p>
16:30-17:00	Coffee/Tea Break
17:00-19:00	<p>Session S1.4 (Chair: Amira Abbas)</p> <p>17:00-17:45 Invited Talk: Max Welling, University of Amsterdam/Microsoft Research <i>Hintons, Quantum Fields, and Deep Learning</i></p> <p>Contributed Talks</p> <p>17:45-18:10 Marco Fanizza, Scuola Normale Superiore di Pisa Paper 82: <i>Testing identity of collections of quantum states: sample complexity analysis</i></p> <p>18:10-18:35 Arne Thomsen, ETH Zurich Paper 61: <i>Complexity of Quantum Support Vector Machines and Quantum Neural Networks</i></p> <p>18:35-19:00 Koichi Miyamoto, Osaka University Paper 6: <i>Linear Regression by Quantum Amplitude Estimation and its Extension to Convex Optimization</i></p>

Tuesday November 9 2021

9:00-11:00	<p>Session S2.1 (Chair: June-Koo Kevin Rhee)</p> <p>9:00-9:45 Invited Talk: Alan Aspuru-Guzik, University of Toronto <i>Machine learning for quantum information: learning to generate quantum optical setups and quantum dynamics</i></p> <p>Contributed Talks</p> <p>9:45-10:10 Frederic Sauvage, Zapata Computing Paper 31: <i>FLIP: A flexible initializer for arbitrarily-sized parametrized quantum circuits</i></p> <p>10:10-10:35 Samson Wang, Imperial College London Paper 70: <i>Impact of Noise and Error Mitigation on Trainability of Variational Quantum Algorithms</i></p> <p>10:35-11:00 Shivshankar, University of Massachusetts Paper 49: <i>Scalable Bosonic Random Walk Networks for Graph Learning</i></p>
11:00-11:30	Coffee/Tea Break
11:30-13:05	<p>Session S2.2 (Chair: Jarrod McClean)</p> <p>11:30-12:15 Invited Talk: Hsin-Yuan Huang, California Institute of Technology <i>Information-Theoretic Bounds on Quantum Advantage in Machine Learning</i></p> <p>Contributed Talks</p> <p>12:15-12:40 Elton Yechao Zhu, Fidelity Center of Applied Technology Paper 81: <i>Generative Quantum Learning of Joint Probability Distribution Functions</i></p> <p>12:40-13:05 Rochisha Agarwal, Indian Institute of Technology, Roorkee Paper 23: <i>Estimating distinguishability measures on quantum computers</i></p>
13:05-14:30	Lunch Break

14:30-16:30	<p>Session S2.3 (Chair: Qibin Zhao)</p> <p>14:30-15:15 Invited Talk: Kosuke Mitarai, Osaka University <i>Experimental realization of quantum machine learning algorithms</i></p> <p>Contributed Talks</p> <p>15:15-15:40 Aikaterini Gratsea, ICFO Paper 38: <i>Storage capacity and learning capability of quantum neural networks</i></p> <p>15:40-16:05 Peter Mernyei, University of Oxford Paper 16: <i>Quantum Circuits for Graph Representation Learning</i></p> <p>16:05-16:30 Tobias Haug, Imperial College London Paper 32: <i>Large-scale quantum machine learning</i></p>
16:30-17:00	<p>Coffee/Tea Break</p>
17:00-18:35	<p>Session S2.4 (Chair: Johannes Jakob Meyer)</p> <p>17:00-17:45 Invited Talk: Maria Schuld, Xanadu/University of KwaZulu-Natal <i>Why machine learning with quantum computers often reduces to kernel methods</i></p> <p>Contributed Talks</p> <p>17:45-18:10 Jonas Kuebler, Max Planck Institute for Intelligent Systems Paper 57: <i>The Inductive Bias of Quantum Kernels</i></p> <p>18:10-18:35 Quoc Hoan Tran, University of Tokyo Paper 30: <i>Universal Approximation Property via Quantum Feature Maps</i></p>

Wednesday November 10 2021

9:00-11:00	<p>Session S3.1 (Chair: Qibin Zhao)</p> <p>9:00-9:45 Invited Talk: Anima Anandkumar, California Institute of Technology <i>Efficient Quantum Optimization via Multi-Basis Encodings and Tensor Rings</i></p> <p>Contributed Talks</p> <p>9:45-10:10 Eric R. Anschuetz, Massachusetts Institute of Technology Paper 4: <i>Quantum Advantage in Basis-Enhanced Neural Sequence Models</i></p> <p>10:10-10:35 Annie Naveh, Woodside Energy Ltd Paper 2: <i>Kernel Matrix Completion for Offline Quantum-Enhanced Machine Learning</i></p> <p>10:35-11:00 Mohan Sarovar, Sandia National Laboratories (<i>no recording</i>) Paper 25: <i>Quantum-inspired manifold learning</i></p>
11:00 – 11:30	Coffee/Tea Break
11:30-13:30	<p>Session S3.2 (Chair: Enrico Rinaldi)</p> <p>11:30-12:15 Invited Talk: Srinivasan Arunachalam, IBM <i>Recent advances in learning quantum states</i></p> <p>Contributed Talks</p> <p>12:15-12:40 Zhaokai Li, University of Science and Technology of China Paper 85: <i>Resonant quantum principal component analysis</i></p> <p>12:40-13:05 Josep Lumbreras, National University of Singapore Paper 35: <i>Multi-armed quantum bandits: Exploration versus exploitation when learning properties of quantum states</i></p> <p>13:05-13:30 Chengran Yang, National University of Singapore Paper 33: <i>Provable superior accuracy in machine learned quantum models</i></p>
13:30-14:30	Lunch Break

14:30-16:30	<p>Session S3.3 (Chair: Vedran Dunjko)</p> <p>14:30-15:15 Invited Talk: Maria Kieferova, University of Technology Sydney <i>Training quantum neural networks with an unbounded loss function</i></p> <p>Contributed Talks</p> <p>15:15-15:40 Sofiene Jerbi, University of Innsbruck Paper 83: <i>Parametrized quantum circuits for reinforcement learning</i></p> <p>15:40-16:05 Casper Gyurik, Leiden University Paper 48: <i>Structural risk minimization for quantum linear classifiers</i></p> <p>16:05-16:30 Brian Coyle, University of Edinburgh Paper 22: <i>Graph neural network initialisation for quantum approximate optimisation</i></p>
16:30-17:00	Coffee Break
17:00-18:35	<p>Session S3.4 (Chair: Alejandro Perdomo-Ortiz)</p> <p>17:00-17:45 Invited Talk: Lenka Zdeborova (EPFL) <i>Understanding machine learning via exactly solvable models</i></p> <p>Contributed Talks</p> <p>17:45-18:10 Manuel Rudolph, Zapata Computing Paper 36: <i>Generation of High Resolution Handwritten Digits with an Ion-Trap Quantum Computer</i></p> <p>18:10-18:35 Niklas Pirnay, TU Berlin Paper 63: <i>Learning of Quantum PUFs based on single-qubit gates</i></p>

Thursday November 11 2021

9:00-10:35	<p>Session S4.1 (Chair: Hsin-Yuan Huang)</p> <p>9:00-9:45 Invited Talk: Jarrod McClean, Google <i>The power of data and simple methods for assessing the possibility of quantum advantage in learning</i></p> <p>Contributed Talks</p> <p>9:45-10:10 Zoe Holmes, Los Alamos National Laboratory Paper 18: <i>Barren plateaus preclude learning scramblers</i></p> <p>10:10-10:35 Joe Gibbs, Los Alamos National Laboratory Paper 14: <i>Long-time simulations with high fidelity on quantum hardware</i></p>
10:35-11:00	<p>Coffee/Tea Break</p>
11:00-12:35	<p>Session S4.2 (Chair: Kosuke Mitarai)</p> <p>11:00-11:45 Invited Talk: Roger Melko, University of Waterloo <i>Generative Models and the Future of Quantum Simulation</i></p> <p>Contributed Talks</p> <p>11:45-12:10 Clemens Gneiting, RIKEN Paper 28: <i>Eigenstate extraction with neural-network tomography</i></p> <p>12:10-12:35 Matija Medvidovic, Columbia University Paper 46: <i>Classical variational simulation of the Quantum Approximate Optimization Algorithm</i></p>
12:35-13:30	<p>Lunch Break</p>
13:30-15:30	<p>Industry Session (Chair: Michele Grossi, CERN)</p> <p>13.30-13.40 Michele Grossi, Introduction to the panel</p> <p>13.41-13.51 Mehdi Bozzorey, Quantum Algorithms Institute</p> <p>13.52-14.02 Tom O'Brien, Google</p> <p>14.03-14.13 Joe Fitzsimons, Horizon Quantum</p> <p>14.14-14.24 Francesco Tacchino, IBM</p> <p>14.25-14.35 Mattia Fiorentini, Cambridge Quantum Computing</p> <p>14.36-14.46 Denise Ruffner, Atom Computing</p> <p>14.47-14.57 Alejandro Perdomo-Ortiz, Zapata Computing</p>

15:30-17:00	<p>Session S4.3 (Chair: Franco Nori)</p> <p>15:30-16:15 Invited Talk: Yusuke Nomura, RIKEN <i>Artificial neural networks for representing quantum many-body states</i></p> <p>16:15-17:00 Invited Talk: Nobuyuki Yoshioka, University of Tokyo <i>Advancing classical and quantum variational algorithms for many-body problems</i></p>
17:00-17:30	<p>Coffee/Tea Break</p>
17:30-19:30	<p>Session S4.4 (Chair: Yihui Quek)</p> <p>17:30-18:15 Invited Talk: Jens Eisert, Free University of Berlin <i>Rigorous approaches to quantum-assisted machine learning</i></p> <p>Contributed Talks</p> <p>18:15-18:40 Elies Gil-Fuster, Freie Universität Berlin Paper 12: <i>Encoding-dependent generalization bounds for parametrized quantum circuits</i></p> <p>18:40-19:05 Matthias C. Caro, Technical University of Munich Paper 13: <i>Generalization in quantum machine learning from few training data</i></p> <p>19:05-19:30 Julien Gacon, IBM Research - Zurich / EPFL Paper 1: <i>Simultaneous Perturbation Stochastic Approximation of the Quantum Fisher Information</i></p>

Friday November 12 2021

8:30 – 10:30	POSTER SESSION 1 (GatherTown, Chair: Kunal Sharma)
10:30 – 11:00	Coffee/Tea Break
11:00-12:35	<p>Session S5.1 (Chair: Yusuke Nomura)</p> <p>11:00-11:45 Invited Talk: Wataru Mizukami, Osaka University <i>Computing time-independent molecular properties using variational (quantum) algorithms</i></p> <p>Contributed Talks</p> <p>11:45-12:10 Adenilton J. da Silva, Universidade Federal de Pernambuco Paper 29: <i>Configurable sublinear circuits for quantum state preparation</i></p> <p>12:10-12:35 Samuel Yen-Chi Chen, Brookhaven National Laboratory Paper 42: <i>Variational Quantum Reinforcement Learning via Evolutionary Optimization</i></p>
12:35-13:30	Lunch Break
13:30-15:05	<p>Session S5.2 (Chair: Franco Nori)</p> <p>13:30-14:15 Invited Talk: Enrico Rinaldi, University of Michigan/RIKEN <i>Quantum gravity in the lab: matrix quantum mechanics meets quantum computing</i></p> <p>Contributed Talks</p> <p>14:15-14:40 Ilia Khait, University of Toronto Paper 68: <i>Optimal control of quantum thermal machines with differentiable programming</i></p> <p>14:40-15:05 Konstantinos Meichanetzidis, Cambridge Quantum Paper 69: <i>QNL P: Compositional Models of Meaning on a Quantum Computer</i></p>

15:05-16:40	<p>Session S5.3 (Chair: Alessandra Di Pierro)</p> <p>15:05-15:50 Invited Talk: Iordanis Kerenidis, CNRS/University Paris Diderot <i>Quantum orthogonal neural networks</i></p> <p>Contributed Talks</p> <p>15:50-16:15 Hayata Yamasaki, Austrian Academy of Sciences/TU Wien <i>Paper 27: Regression and Classification with Optimized Random Features: Applications of Exponential Speedup by Quantum Machine Learning without Sparsity and Low-Rankness Assumptions</i></p> <p>16:15-16:40 Eliska Greplova, Delft University of Technology <i>Paper 72: Automated NV-centre calibration for quantum internet nodes</i></p>
16:40-17:00	Coffee/Tea Break
17:00-19:00	POSTER SESSION 2 (GatherTown, Chair: Eliska Greplova)