



Quantum Techniques in Machine Learning 2018: Programme

12-16 November 2018, Durban, South Africa

Sunday

15:20-17:30 Arrival and registration
18:30 onward Evening reception

Monday

9:00-9:25 Welcome

9:25-10:10 Alejandro Perdomo-Ortiz (Rigetti)
A machine learning approach for benchmarking and training shallow quantum circuits

10:10-10:40 *Coffee break*

10:40-11:25 Fabio Sciarrino (Sapienza Università di Roma)
Machine learning for certification of photonic quantum information

11:25-11:50 Ryan Sweke (Freie Universität Berlin)
Reinforcement learning methods for quantum error correction

11:50-12:15 Petru Tighineanu (Max Planck Institute for the Science of Light)
Deep reinforcement learning for quantum memory

12:15-14:00 *Lunch break*

14:00-14:25 Gael Sentís (University of Siegen)
Unsupervised classification of quantum data

14:25-14:50 Marco Fanizza (Scuola Normale Superiore di Pisa)
Optimal universal learning machines for quantum state discrimination

14:50-15:20 *Coffee break*

15:20-15:45 Riccardo Mengoni (University of Verona)
Homological analysis of multi-qubit entanglement

15:45-16:30 Tutorial: Open-source software for quantum computing
Mark Fingerhuth (ProteinQure)

Tuesday

- 9:00-9:45 Jonathan Olson (Zapata Computing)
Applications of quantum autoencoders and learning with noise
- 9:45-10:10 Yudong Cao (Zapata Computing)
Exact compression of quantum states and effective ansatz for quantum autoencoder
- 10:10-10:40 *Coffee break and poster viewing*
- 10:40-11:25 Maria Schuld (University of KwaZulu-Natal, Xanadu)
Making quantum algorithms learn from data
- 11:25-11:50 Jonathan Romero (Harvard University)
Hybrid quantum-classical schemes for generative adversarial learning: HQGANs
- 11:50-12:15 Thomas Konrad (University of KwaZulu-Natal)
Quantum optimization using the Gradient method
- 12:15-14:00 *Lunch break*
- 14:00-14:25 Adenilton da Silva (Universidade Federal Rural de Pernambuco)
Quantum enhanced cross-validation with a parametric probabilistic quantum memory
- 14:25-14:50 Wilson de Oliveira (Universidade Federal Rural de Pernambuco)
Duality quantum neural networks
- 14:50-15:20 *Coffee break*
- 15:20-16:05 Vedran Dunjko (LIACS, University of L'Vedraneiden)
A route towards quantum-enhanced artificial intelligence
- 16:05-16:30 Shang Yu (University of Science and Technology China)
Experimentally detecting a quantum change point via Bayesian inference
- 16:30-17:30 Tutorial: Quantum machine learning with IBM Quantum Experience
Part A - Introduction Waheeda Saib, Ismail Akhalwaya (IBM Africa)
Part B - Carsten Blank (Data Cybernetics)

Wednesday

- 9:00-9:45 Patrick Huembeli (ICFO)
Machine learning assisted quantum physics
- 9:45-10:10 Raban Iten (ETH Zurich)
Discovering physical concepts with neural networks
- 10:10-10:40 *Coffee break*
- 10:40-11:25 Raphael Poser (Oak Ridge National Laboratory)
Machine learning as a benchmark on current hardware
- 11:25-11:50 Niels Jakob Sørensen (Aarhus University)
High-fidelity conditional two-qubit swapping gate
- 11:50-12:15 Laszlo Gyongyosi (University of Southampton)
Problem solving optimization by machine learning for Gate-Model quantum computers
- 12:15-13:00 *Lunch break*
- 13:00 onward Excursion to Tala Game Reserve including conference dinner

Thursday

- 9:00-9:45 Miles Stoudenmire (Flatiron Institute)
Classical and quantum machine learning with tensor networks
- 9:45-10:10 Ivan Glasser (Max Planck Institute of Quantum Optics)
Neural-network and tensor-network duality: applications in quantum physics and machine learning
- 10:10-10:40 *Coffee break*
- 10:40-11:25 Nana Liu (CQT University of Singapore)
Quantum computation, security and machine learning: a look at adversarial quantum learning
- 11:25-11:50 Makhamisa Senekane (National University of Lesotho)
Searching for majorana zero modes using model-free reinforcement learning
- 11:50-12:15 Hendrik Nautrup (Innsbruck University)
Machine learning in quantum experiments
- 12:15-14:00 *Lunch break*
- 14:00-14:25 Daniel Park (Korea Advanced Institute of Science and Technology)
Learning quantum parity oracle with maximally mixed input qubits

14:25-14:50 Kevin Rhee (Korea Advanced Institute of Science and Technology)
Quantum-classical reinforcement parity learning from noisy classical data

14:50-15:20 *Coffee break*

15:20-16:05 Mikel Sanz (University of the Basque Country)
Quantum memristors and neuromorphic quantum computing

16:05-17:00 Tutorial: Quantum machine learning with Strawberry Fields
Maria Schuld (University of KwaZulu-Natal, Xanadu)

Friday

9:00-9:45 Pietro Rotondo (University of Nottingham)
Open quantum generalization of Hopfield neural networks

9:45-10:10 Christina Giarmatzi (University of Queensland)
Witnessing non-Markovianity with quantum memory

10:10-10:40 *Coffee break*

10:40-11:25 Mark Fingerhuth (ProteinQure)
Gaussian boson sampling for molecular docking

11:25-12:15 Discussion and closing

12:15-14:00 *Lunch break*