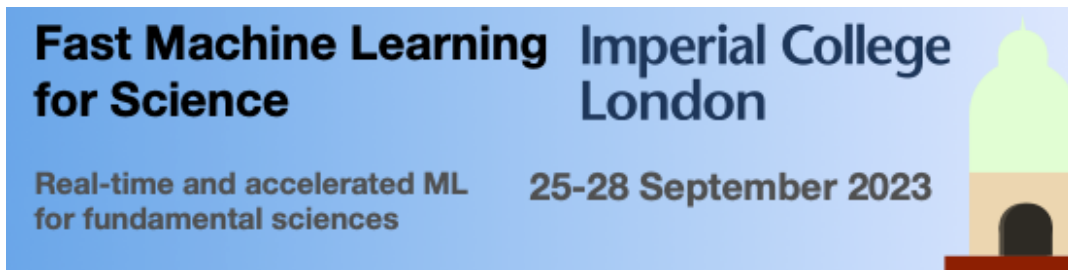


Session Program

25-28 Sept 2023



Fast Machine Learning for Science Workshop 2023

Contributed Talks

Imperial College London, Blackett Laboratory, Lecture Theatre 1
Blackett Laboratory

Monday 25 September

13:30

Contributed Talks: High Energy Physics

Session | **Location:** Imperial College London, Blakett Laboratory, Lecture Theatre 1, Blakett Laboratory

13:30-13:45

Smart embedded DAQ systems for radiation instrumentation - Testbench and latest results

Speaker

Prof. Audrey Corbeil Therrien

13:45-14:00

Scalable neural network models and terascale datasets for particle flow reconstruction

Speaker

Farouk Mokhtar

14:00-14:15

Track reconstruction for the ATLAS Phase-II High-Level Trigger using Graph Neural Networks on FPGAs

Speaker

Santosh Parajuli

14:15-14:30

smartpixels: on-pixel featurization for single layer silicon tracking

Speaker

Rachel Kovach-Fuentes

14:30-14:45

Portable Acceleration of CMS Mini-AOD Production with Coprocessors as a Service

Speaker

William Patrick McCormack

14:45-15:00

Accelerating Hadronic Calorimetry with Sparse Point-Voxel Convolutional Neural Networks

Speaker

Jeffrey Krupa

15:00

15:30

Contributed Talks: High Energy Physics

Session | **Location:** Imperial College London, Blakett Laboratory, Lecture Theatre 1, Blakett Laboratory

15:30-15:45

Convolutional Neural Networks for Real-Time Processing of ATLAS Liquid-Argon Calorimeter Signals

Speaker

Anne-Sophie Berthold

15:45-16:00

Fast ML inference in FPGAs for the Level-1 Scouting system at CMS

Speaker
Thomas Owen James

16:00–16:15

Yggdrasil Conifer: Latency and resource-aware decision trees for faster FPGA inference at the LHC

Speaker
Andrew George Oliver

16:15–16:30

fwXmachina part 1: Classification with boosted decision trees on FPGA for L1 trigger

Speaker
Tae Min Hong

16:30–16:45

Realtime Anomaly Detection in the CMS Experiment Global Trigger Test Crate

Speaker
Chang Sun

16:45

17:00

Contributed Talks: High Energy Physics - Lightning

Session | **Location:** Imperial College London, Blackett Laboratory, Lecture Theatre 1, Blackett Laboratory

17:00–17:05

fwXmachina part 3: Anomaly detection with decision tree autoencoder on FPGA for L1 trigger

Speaker
Stephen Roche

17:05–17:10

Fast muon identification algorithm on FPGAs for the Phase II level 0 trigger of the ATLAS experiment

Speaker
Graziella Russo

17:10–17:15

Neuromorphic Computing for On-Sensor Data Filtering on Smart-Pixels

Speaker
Shruti R Kulkarni

17:15–17:20

Intelligent experiments through real-time AI: Fast Data Processing and Autonomous Detector Control for sPHENIX and future EIC detectors

Speaker
Micol Rigatti

17:20–17:25

Harnessing charged particle tracks in the Phase-2 CMS Level-1 Trigger with ultrafast Machine Learning

Speaker
Christopher Edward Brown

17:25-17:30

B-tagging and Tau reconstruction in the Level-1 Trigger with real-time Machine Learning**Speaker**

Duc Minh Hoang

17:30-17:35

Machine Learning based Data Compression on FPGA with HLS4ML**Speaker**

Pratik Jawahar

17:35-17:40

Using NVIDIA Triton Server for Inference-as-a-Service at Fermilab**Speaker**

Claire Savard

17:40-17:45

Jets as sets or graphs: Fast jet classification on FPGAs for efficient triggering at the HL-LHC**Speaker**

Denis-Patrick Odagiu

17:45-17:50

Efficient and Robust Jet Tagging at the LHC with Knowledge Distillation**Speaker**

Mr Ryan Liu

17:50-17:55

Fast b-tagging at the high-level trigger of the ATLAS experiment**Speaker**

Stefano Franchellucci

17:55-18:00

BDT for tau identification in the ATLAS Level-1 trigger**Speaker**

David Reikher

18:00-18:05

A Convolutional Neural Network for topological fast selection algorithms in FPGAs for the HL-LHC upgrade of the CMS experiment**Speaker**

Maciej Mikolaj Glowacki

18:05-18:10

Low Energy LArTPC Signal Detection using Anomaly Detection**Speaker**

Jovan Mitrevski

18:10-18:15

Graph Neural Networks on FPGAs with HLS4ML**Speaker**

Jan-Frederik Schulte

18:15-18:20

Optimizing Sparse Neural Architectures for Low-Latency Anomaly Detection**Speaker**

Luke McDermott

18:20-18:25

Accommodating Transformer in the FastML era of HEP-EX

Speaker

Sitian Qian

18:30

Tuesday 26 September

13:30

Contributed Talks: Astrophysics, Accelerators

Session | **Location:** Imperial College London, Blackett Laboratory, Lecture Theatre 1, Blackett Laboratory

13:30–13:45

Deep Spectral Networks: Enhancing Orbit Propagation and Determination in Astrodynamics

Speaker

Sabin Anton

13:45–14:00

Machine Learning Explorations in GRB Studies: From Classification to Extended Emission Identification

Speaker

Keneth Stiven Garcia Cifuentes

14:00–14:15

GWAK: Gravitational-Wave Anomalous Knowledge with Recurrent Autoencoders

Speaker

Katya Govorkova

14:15–14:30

Tools and Results for Real-Time Deep Learning in Gravitational-Wave Physics

Speaker

Eric Anton Moreno

14:30–14:45

Real Time End to End Supernova Pointing

Speaker

Maira Khan

14:45–15:00

Edge AI for accelerator controls: beam loss deblending

Speaker

Jovan Mitrevski

15:00–15:15

Adaptive Machine Learning for Quench Prediction

Speaker

Maira Khan

15:15–15:30

Real-Time Instability Tracking with Deep Learning on FPGAs in Magnetic Confinement Fusion Devices

Speaker

Ryan Forelli

15:30

16:00

Contributed Talks: Materials Science, Medicine, Theory

Session | **Location:** Imperial College London, Blackett Laboratory, Lecture Theatre 1, Blackett Laboratory

16:00-16:15

SAMBA: A Trainable Segmentation Web-App with Deep-Learning Powered Labelling

Speaker

Ronan Docherty

16:15-16:30

Real-time Fitting and Materials Characterization in Band- Excitation Piezoresponse Force Microscopy

Speaker

Veronica Obute

16:30-16:45

Real-Time Machine Learning in Materials Microscopy and Spectroscopy

Speaker

Prof. Joshua Agar

16:45-17:00

A hybrid data-driven and data assimilation operational model for long term spatiotemporal forecasting: Global and regional PM2.5 forecasting

Speaker

Dr Fangxin Fang

17:00-17:15

Towards lightweight transformer-based models with multimodal data for low-latency surgical applications

Speaker

Miguel Xochicale

17:15-17:30

Approximating Many-Electron Wave Functions using Neural Networks

Speaker

Matthew Foulkes

17:30-17:35

Crystallization Learning with Delaunay Triangulation

Speakers

Prof. Guosheng Yin, Guosheng Yin

17:35-17:40

Genomic Interpreter: A Hierarchical Genomic Deep Neural Network with 1D Shifted Window Transformer

Speaker

Zehui Li

17:40

Wednesday 27 September

13:30

Contributed Talks: Computer Science

Session | **Location:** Imperial College London, Blackett Laboratory, Lecture Theatre 1, Blackett Laboratory

13:30-13:45

Hardware-aware pruning of real-time neural networks with hls4ml Optimization API

Speaker

Benjamin Ramhorst

13:45-14:00

Efficient Quantization of Deep Learning Models for Hardware Acceleration

Speakers

Cheng ZHANG, Mr Jianyi Cheng

14:00-14:15

High Granularity Quantization for Ultra-Fast ML Applications on FPGAs

Speaker

Chang Sun

14:15-14:30

EventDetector: A Python Package for Time Series Event Detection

Speaker

Dr Menouar Azib

14:30-14:45

FKeras: A Sensitivity Analysis Tool for Edge Neural Networks

Speaker

Olivia Weng

14:45-15:00

Reconfigurable Fused and Branched CNN Accelerator

Speakers

Mr Rizwan Tariq Syed, Dr Marko Andjelkovic, Dr Markus Ulbricht, Prof. Milos Krstic

15:00-15:15

PolyLUT: Learning Piecewise Polynomials for Ultra-Low Latency FPGA LUT-based Inference

Speaker

Marta Andronic

15:15-15:30

Exploring medical applications of fast ML with a novel FPGA firmware framework

Speaker

Freddie Renyard

15:30

16:00

Contributed Talks: Computer Science

Session | **Location:** Imperial College London, Blackett Laboratory, Lecture Theatre 1, Blackett Laboratory

16:00-16:15

Running Converged HPC & AI Workloads on the Groq AI Inference Accelerator

Speaker

Dr Tobias Becker

16:15-16:30

Optimizing for Imperfections in Analog Neural Computations on BrainScaleS-2**Speakers**

Eric Kern, Hendrik Borras

16:30-16:45

Implementing Machine Learning Methods on QICK Hardware for Qubit Readout**Speaker**

Javier Campos

16:45-17:00

Post-training ReLU Sparsification for Faster CNN Inference on FPGA Streaming Accelerators**Speakers**

Mr Krish Agrawal, Mr Zhewen Yu, Mr Alexander Montgomerie-Corcoran

17:00-17:15

ATHEENA: A Toolflow for Hardware Early-Exit Network Automation**Speaker**

Benjamin Biggs

17:15-17:20

Simplifying Time-Series Recognition: Automated Feature Extraction and Modern Classification**Speaker**

Jan Zavadil

17:20-17:25

Universal approximation theorem and error bounds for quantum neural networks and quantum reservoirs**Speaker**

Dr Lukas Gonon

17:25-17:30

AI Upscaling with Super Resolution CNNs on FPGAs and ASICs**Speaker**

Ryan Forelli

17:30