

Technical Workshop Welcome



Maria Girone, CERN-IT



CERN

openlab

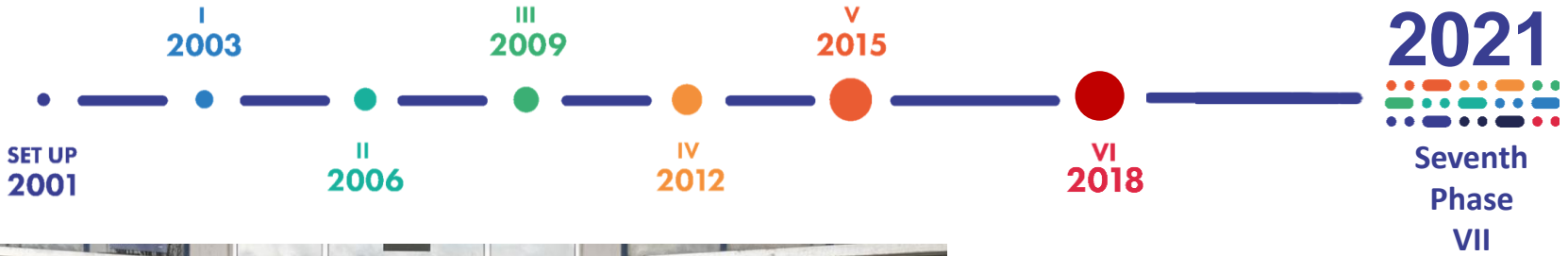
Technical Workshop 2023

Welcome to the 2023 CERN openlab technical workshop

- It is very nice to have in-person participation again and see people

We have a very busy two days and many **opportunities for discussions** (poster session, coffee breaks, lunches, networking cocktail)

Driving Innovation for more than 20 years



Collaboration members

PARTNERS

CONTRIBUTORS

ASSOCIATES

RESEARCH

Four pillars of R&D

Exascale technologies

A comprehensive investigation of HPC and Cloud infrastructures, frameworks, tools to support key scientific workloads and applications

Artificial intelligence

Analysis and development of algorithms, optimisation for new architectures, interpretability, synergies between Physics and other sciences

Quantum computing

Assess the potential impact of quantum computing in HEP and other sciences, investigate quantum machine learning algorithms and areas of potential quantum advantage, set up a collaborative quantum computing (simulation) platform

Multi-science collaborations

Share the expertise and knowledge generated across all activities with other sciences, work with CERN KT to explore novel applications of CERN computing systems and ideas, create collaborations and contribute to common solutions

Today

Exascale technologies

A comprehensive investigation of HPC and Cloud infrastructures, frameworks, tools to support key scientific workloads and applications

Integrating DPC++/oneAPI in the ATLAS software 503/1-001 - Council Chamber, CERN	<i>Attila Krasznahorkay</i> 10:15 - 10:30
Using SYCL for accelerating CMS physics reconstruction algorithms on heterogeneous backends 503/1-001 - Council Chamber, CERN	<i>Felice Pantaleo</i> 10:30 - 10:45
OneAPI for LHCb High Level Trigger 503/1-001 - Council Chamber, CERN	<i>Apostolos Karvelas</i> 10:45 - 11:00
Accelerating Madgraph with CPU vectorization and GPUs 503/1-001 - Council Chamber, CERN	<i>Andrea Valassi</i> 11:00 - 11:15
HEPScore benchmarking 503/1-001 - Council Chamber, CERN	<i>Domenico Giordano</i> 11:45 - 12:00
Heterogeneous architectures testbed 503/1-001 - Council Chamber, CERN	<i>Joaquim Santos et al.</i> 12:00 - 12:15
HPC Benchmarking 503/1-001 - Council Chamber, CERN	<i>David Southwick</i> 12:15 - 12:30
Mapping ROOT RNTuple I/O data structures to DAOS objects 503/1-001 - Council Chamber, CERN	<i>Javier Lopez Gomez et al.</i> 14:15 - 14:30
The ATLAS Dataflow high-throughput distributed storage system 503/1-001 - Council Chamber, CERN	<i>Mateusz Kojro</i> 14:30 - 14:45
NextGen Archiver for WinCC OA-based SCADA systems at CERN 503/1-001 - Council Chamber, CERN	<i>Antonin Kveton</i> 14:45 - 15:00
Data Analytics for industrial control systems 503/1-001 - Council Chamber, CERN	<i>Abhit Patil</i> 15:00 - 15:15
Update on EOS productisation - Comrade 360's EOS Windows Native Client 503/1-001 - Council Chamber, CERN	<i>Luca Mascetti et al.</i> 15:15 - 15:30
High level plan for integration of Oracle cloud resources into CERN IT BC&DR project 503/1-001 - Council Chamber, CERN	<i>Miroslav Potocky</i> 15:30 - 15:40
Migration between Kubernetes versions doesn't have to be error-prone 503/1-001 - Council Chamber, CERN	<i>Adrian Karasinski</i> 15:40 - 15:50
ML model registry in the Cloud 503/1-001 - Council Chamber, CERN	<i>Renato Paulo Da Costa Cardoso</i> 16:30 - 16:45
Real-time deep learning inference and FPGA based processing for level 1 trigger scouting at CMS 503/1-001 - Council Chamber, CERN	<i>Thomas Owen James</i> 16:45 - 17:00
CoE RAISE: Enabling AI on HPC systems 503/1-001 - Council Chamber, CERN	<i>Eric Wulff</i> 17:00 - 17:15
The interTwin project - Prototyping an interdisciplinary Digital Twin Engine 503/1-001 - Council Chamber, CERN	<i>Alexander Zochbauer et al.</i> 17:15 - 17:35
Environmental Modeling and Prediction Platform 503/1-001 - Council Chamber, CERN	<i>Ilaria Luise</i> 17:35 - 17:50



Workshop Photo 503/1-001 - Council Chamber, CERN	13:30 - 13:45
A message from the Head of IT Department 503/1-001 - Council Chamber, CERN	<i>Enrica Maria Porcari</i> 13:45 - 13:55
CERN IT Innovation Roadmap 503/1-001 - Council Chamber, CERN	<i>Alberto Di Meglio</i> 13:55 - 14:15



Coffee break with poster session

15:50 - 16:30

Tomorrow

Artificial intelligence

Analysis and development of algorithms, optimisation for new architectures, interpretability, synergies between Physics and other sciences

Friday

Deep Learning based reconstruction for DUNE

Marco Rossi

503/1-001 - Council Chamber, CERN

09:00 - 09:15

Generative Models for Simulation

Kristina Jaruskova

503/1-001 - Council Chamber, CERN

09:15 - 09:30

Foundation models

Renato Paulo Da Costa Cardoso

503/1-001 - Council Chamber, CERN

09:30 - 09:45

The Roche project in LHCb

Olivia Jullian Parra

503/1-001 - Council Chamber, CERN

09:45 - 10:00

Tomorrow

Quantum computing

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Friday

Introduction	<i>Dr Sofia Vallecorsa</i>
503/1-001 - Council Chamber, CERN	10:30 - 10:40
Quantum Algorithms for anomaly detection at the LHC	<i>Vasilis Belis</i>
503/1-001 - Council Chamber, CERN	10:40 - 10:55
Simulatability of quantum circuits	<i>Carla Rieger</i>
503/1-001 - Council Chamber, CERN	10:55 - 11:10
QML: connecting the dots	<i>Dr Michele Grossi</i>
503/1-001 - Council Chamber, CERN	11:10 - 11:30

Tomorrow

Multi-science collaborations

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Friday

AI for satellite image analysis at UNOSAT 503/1-001 - Council Chamber, CERN	<i>Ruiyi Zhang et al.</i> 11:30 - 11:45
Quantum Machine Learning for Earth Observation Images 503/1-001 - Council Chamber, CERN	<i>Su Yeon Chang</i> 11:45 - 12:00
Solving differential equations with quantum computers: state of the art and perspectives 503/1-001 - Council Chamber, CERN	<i>Alice Barthe</i> 12:00 - 12:15
High-Performance and Scalable Agent-Based Simulation with BioDynaMo 503/1-001 - Council Chamber, CERN	<i>Lukas Breitwieser</i> 12:15 - 12:30
The Parkinson's disease and its challenges: a solution for smart monitoring 503/1-001 - Council Chamber, CERN	<i>Samuel Simko</i> 12:30 - 12:45

Technology Session

Tomorrow afternoon
we have a session
dedicated to
technology

Programming the NVIDIA Platform: Accelerate time to Science	<i>Filippo Spiga</i>
<i>503/1-001 - Council Chamber, CERN</i>	<i>14:00 - 14:30</i>
Accelerating HPC and AI with Intel	<i>Bruno Riva</i>
<i>503/1-001 - Council Chamber, CERN</i>	<i>14:30 - 15:00</i>
Micron CXL Memory Solutions	<i>Emanuele Confalonieri</i>
<i>503/1-001 - Council Chamber, CERN</i>	<i>15:00 - 15:30</i>
Siemens: MLOps on the Edge	<i>Thomas Kaufmann</i>
<i>503/1-001 - Council Chamber, CERN</i>	<i>15:30 - 16:00</i>

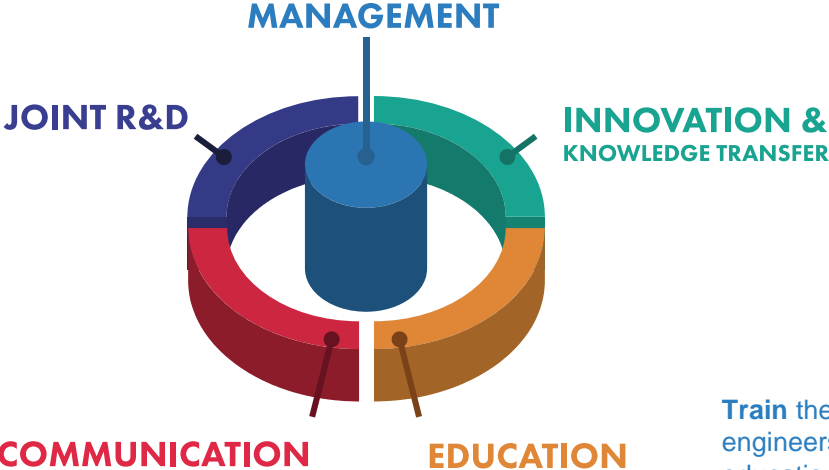
Let's get started!



CERN OPENLAB'S MISSION

Evaluate and test state-of-the-art technologies in a challenging environment and improve them in collaboration with industry.

Communicate results, demonstrate impact, and reach new audiences.



Collaborate and exchange ideas with other communities to create knowledge and innovation.

Train the next generation of engineers/researchers, **promote** education and cultural exchanges.