Maria Girone, CERN openlab CTO
CERN: A UNIQUE ENVIRONMENT

Pushing technologies to their limits
A VIRTUOUS CYCLE
Driving ICT innovation in science

CERN REQUIREMENTS
PUSH THE LIMIT

PRODUCE ADVANCED PRODUCTS AND SERVICES

APPLY NEW TECHNIQUES AND TECHNOLOGIES

TEST PROTOTYPES IN CERN ENVIRONMENT

JOINT DEVELOPMENT IN RAPID CYCLES

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CERN OPENLAB’S MISSION

Our recipe for success

• **Evaluate** state-of-the-art technologies in a challenging environment and improve them.

• **Test** in a research environment today technologies that will be used in many business sectors tomorrow.

• **Train** the next generation of engineers/researchers.

• **Promote** education and cultural exchanges.

• **Communicate** results and reach new audiences.

• **Collaborate** and exchange ideas to create knowledge and innovation.
DRIVING INNOVATION SINCE 2001

We are now in our sixth three-year phase

SET UP 2001

I 2003

II 2006

III 2009

IV 2012

V 2015

2018

Sixth Phase VI

CERN openlab Collaboration Board 2018

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COLLABORATION MEMBERS

A public-private partnership between the research community and industry

PARTNERS | CONTRIBUTORS | ASSOCIATES | RESEARCH

[Logos of Intel, IBM, Oracle, Siemens, Micron, Google, bestudys, E4, openO systems, COMTRADE, INFN, Fermilab, TU/e, King's College London, Newcastle University, SAMARA UNIVERSITY]
ICT RESEARCH AREAS

Tackling tomorrow’s ICT challenges today

- Data acquisition and filtering
  *Collecting data*

- Networks and connectivity
  *Connecting resources*

- Data storage architectures
  *Storing and serving data*

- Compute management and provisioning (cloud)
  *Managing resources for processing*

- Computing platforms, data analysis, simulation
  *Improving processing and code efficiency*

- Data analytics
  *Extracting information*

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Online and offline reconstruction algorithms on GPU, fast simulation data quality monitoring, physics data reduction, large-scale multi-disciplinary platforms, anomaly detection

High-bandwidth fabrics, specialized d processors for data acquisition

Data analyses, classical optimizations

Simulation and reconstruction algorithms optimization

Cloud federations, containers, scalability

Maria.Girone@cern.ch
KNOWLEDGE SHARING

Working with communities beyond high-energy physics

Working closely with research institutes worldwide on initiatives aimed at sharing tools, skills, and knowledge between the high-energy physics community and other research fields.

Examples of ongoing projects related to biomedical research.

**BioDynaMo**
*Developing a cloud-based platform for modelling biological development.*

**Smart Platforms for Science**
*Supporting a complete data-analysis life cycle.*

**LivingLab**
*Integrating health data from diverse sources for systems-biology studies.*
EDUCATION AND TRAINING

Training tomorrow’s leaders in ICT
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CERN openlab runs a highly competitive summer-student programme

~ 40 students selected from around 1600 applicants

Most dedicated CERN openlab personnel are young, talented ‘fellows’.

Receive hands-on experience with cutting-edge technologies

Workshops, training courses, and other initiatives run with our collaborators.

Competitions, challenges, online training, hackathons.

Experts from industry and research give lectures.

Participate in events both inside and outside CERN.

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EDUCATION AND TRAINING

Training tomorrow’s leaders in ICT

CERN-hosted WORKSHOPS on advanced topics

Contributors to the CERN SCHOOL OF COMPUTING

On-site LECTURES for summer students

Technical SEMINARS from CERN staff or invited guests

Publication of TECHNICAL PAPERS AND POSTERS

JOINT EVENTS with industry members

KEYNOTE PRESENTATION at leading global events

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QUESTIONS?

Your email address

Other contact (e.g. Twitter)
CONTACTS

ALBERTO DI MEGLIO
CERN openlab Head
alberto.di.meglio@cern.ch

MARIA GIRONE
CERN openlab CTO
maria.girone@cern.ch

FONS RADEMAKERS
CERN openlab CRO
fons.rademakers@cern.ch

ANDREW PURCELL
CERN openlab Communications Officer
andrew.purcell@cern.ch

KRISTINA GUNNE
CERN openlab Administration/Finance Officer
kristina.gunne@cern.ch

FEDERICO CARMINATI
CERN openlab CIO
federico.carminati@cern.ch

www.cern.ch/openlab

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