



CERN openlab summer student lectures

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CERN openlab

CERN openlab is a unique **public-private partnership**.

We work to drive **innovation in computing technologies**.

We collaborate with leading technology **companies** (including Intel, Oracle, Siemens, Micron, Google).

We also work with other research **laboratories** (including Fermilab and INFN).

Education and training are important aspects of our work.

Over 2000 applicants for this year's CERN openlab summer student programme.

30 students selected from **21** different countries.

More info on our website: openlab.cern

Follow us on Twitter/Facebook: [@CERNopenlab](https://twitter.com/CERNopenlab).



Lectures from the main programme

Particularly recommended to openlab students



From Raw Data to Physics Results

Paul James Laycock

Main Auditorium (500/1-001)

11:35-12:30, 28 June

09:15-10:10, 29 June

10:25-11:20, 30 June



Foundation of Statistics

Glen Cowan

Main Auditorium (500/1-001)

09:15-10:10, 4 July

10:25-11:20, 5 July

09:15-10:10, 6 July

11:35-12:30, 7 July

Openlab lecture programme

Based on openlab pillars. **In-person for openlab students**, webcast available for the others.



Welcome and introduction to CERN
Alberto Di Meglio, Maria Girone, Anna Cook
IT Amphitheatre (31/3-004)
14:00-15:00, 4 July



Tackling computer challenges at CERN
Alessandro Di Girolamo, Maria Girone
IT Amphitheatre (31/3-004)
15:00-16:00, 4 July



DAQ-filtering data from 50 TB/s to 1GB/s
Flavio Pisani
IT Amphitheatre (31/3-004)
14:00-16:00, 10 July



Computer Security: Past, Present & Future
Stefan Lueders
IT Amphitheatre (31/3-004)
14:00-16:00, 11 July

Openlab lecture programme (2)

AI and High-performance Computing (HPC).



Introduction to Machine Learning and Deep Learning

Michael Kagan

IT Amphitheatre (31/3-004)

14:00-16:30, 13 July



Graph Neural Networks: From fundamentals to Physics application

Ilias Tsaklidis

IT Amphitheatre (31/3-004)

14:00-16:00, 17 July



Hyperparameter Optimization for Deep Learning Models Using High Performance Computing

Eric Wulff

IT Amphitheatre (31/3-004)

14:00-16:00, 18 July



Reinforcement learning and its applications at CERN

Matteo Bunino

IT Amphitheatre (31/3-004)

14:00-15:30, 20 July

Openlab lecture programme (3)

Quantum computing.



Basics of quantum computing (theory)

Alice Barthe

BE Auditorium Meyrin (6/2-024)

14:00-15:30, 27 July



Basics of quantum computing (practice)

Su Yeon Chang

BE Auditorium Meyrin (6/2-024)

15:30-17:00, 27 July



Applications of Quantum Computing: CERN use case, Quantum Machine Learning and optimization

Carla Sophie Rieger

IT Amphitheatre (31/3-004)

14:00-15:30, 31 July



Quantum Kernel Methods (hands-on on Quask)

Francesco Di Marcantonio, Roman Wixinger

IT Amphitheatre (31/3-004)

15:30-16:00, 31 July

Openlab lecture programme (4)

Advanced programming techniques.



GPU programming

Stephan Hageboeck

IT Amphitheatre (31/3-004)

14:00-16:00, 1 August



Best practices: the theoretical and practical underpinnings of writing code that is less bad

Axel Naumann

IT Amphitheatre (31/3-004)

14:00-15:30, 3 August

Openlab lecture programme (5)

Digital twins and advanced storage solutions.



Agent-based modeling: BioDynaMo

Lukas Breitwieser

IT Amphitheatre (31/3-004)

14:00-16:00, 25 July



Digital twins and their application at CERN

Ilaria Luise, Alexander Zoechbauer,

Kalliopi Tsolaki

IT Amphitheatre (31/3-004)

14:00-16:00, 7 August



Highly durable and dense data storage through synthetic DNA

Raja Appuswamy

IT Amphitheatre (31/3-004)

14:00-16:00, 8 August

More info on the lectures on Indico:
<https://indico.cern.ch/category/16988/>

Evening lectures

Open to all summer students!



Introduction to quantum computing (1/2)

Ahmed Abdelmottaleb

IT Amphitheatre (31/3-004)

17:00-18:30, 25 July



Introduction to quantum computing (2/2)

Ahmed Abdelmottaleb

IT Amphitheatre (31/3-004)

17:00-18:30, 26 July



Movie night: “Particle Fever”

Mark Levinson

Main Auditorium (500/1-001)

19:30-22:00, 25 July



Lightning talks

- Students work on projects over nine weeks, gaining hands-on experience with latest computing technologies.
- 5-minute presentations by each student, with prizes for best talks.
- Split into two sessions: **15th and 16th of August.**
- Events will be online and open to all.

Webfest 2023

- Running **Friday 21 July – Sunday 23 July**
- Kick-off (Friday) in B40; Hacking day (Saturday) in R1; Closing and rewards (Sunday) in B40.
- This year's theme is education, science, research.
- How CERN's cutting-edge technologies can be applied to science.
- Open to all! Students, fellows, staff members...



The poster for Webfest 2023 features a dark blue background with various white icons representing science and technology, such as a DNA helix, a calculator, a circuit board, a test tube, a bar chart, a recycling symbol, and a globe. The main text is centered and reads: 'WEB FEST CHALLENGE 2023' in large, bold, multi-colored letters. Above this, it says 'JULY 21-23 • BUILDING 40'. Below the main title, it includes the hashtag '#CERNWEBFEST' and the theme 'SCIENCE + TECH DATA + CREATIVITY COMMUNITY + YOU'. At the bottom, there is a pink banner with the text 'EDUCATION, SCIENCE, RESEARCH' and a Facebook icon next to 'CERN Webfest' and a globe icon next to the URL 'https://webfest.cern'. A small paragraph at the very bottom encourages participants to contribute their knowledge to develop innovative app ideas, collaborate with amazing people, and help improve education, research, and open science.

JULY 21-23 • BUILDING 40

WEB FEST CHALLENGE 2023

#CERNWEBFEST

SCIENCE + TECH
DATA + CREATIVITY
COMMUNITY + YOU

EDUCATION, SCIENCE, RESEARCH

 CERN Webfest  <https://webfest.cern>

Contribute your knowledge to develop innovative app ideas, collaborate with amazing people and help improve education, research, and open science.