



CERN

openlab



Lecture Programme

Fariza Oulashova

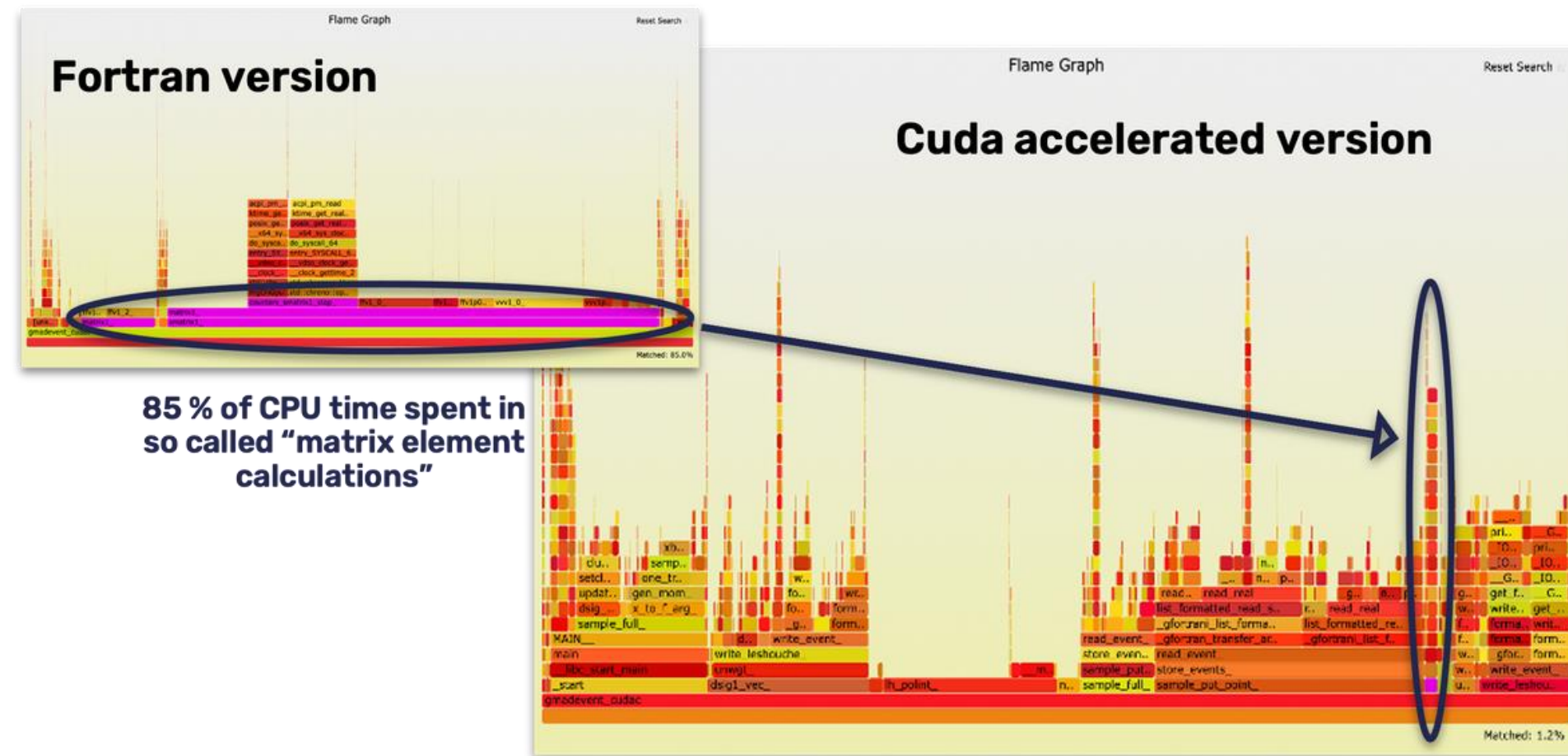
Introduction to CERN, computing and cybersecurity

Proposed lectures

-  **Tackling computing challenges at CERN**
Alessandro Di Girolamo
Thu, 2 July:
-  **Computer Security: Past, Present & Future**
Stefan Lueders
Wed, 3 July: 13:30 - 15:30
-  **DAQ-filtering data from 50 TB/s to 1GB/s**
Flavio Pisani
Thu, 4 July: 13:30 - 15:30

-  **Foundation of Statistics**
Glen Cowan
Tue, 9 July: 11:35 - 12:30
Wed, 10 July: 9:15 - 10:10
Thu, 11 July: 11:35 - 12:30
Fri, 12 July: 10:25 - 11:20
 -  **From Raw Data to Physics Results**
Paul James Laycock
Wed, 3 July: 11:35 - 12:30
Thu, 4 July: 9:15 - 10:10
Fri, 5 July: 10:25 - 11:20
- Main Auditorium**

Exascale technologies: Heterogeneous Architectures Adoption



Madgraph5_aMC@NLO speedup on NVidia GPUs for fast MCMC simulations.

Proposed lectures



Data Centre Hardware

Luca Atzori

Wed, 17 July: 13:30 - 15:00



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

Axel Naumann

Mon, 22 July: 13:30 - 15:30



GPU programming

Stephan Hageboeck

Tue, 23 July: 13:30 - 15:30

Exascale Technologies: Advanced Data and Storage Solutions

We collaborate with SIEMENS, Comtrade, and ORACLE



Proposed lectures



Storage

Abhishek Lekshmanan

Wed, 17 July: 15:00 - 16:30


Physics data recording with EOS. Image courtesy of [Luca Mascetti et al.](#)


Exascale technologies: AI and HPC


Proposed lectures

 **Introduction to Machine Learning**
Michael Kagan
Fri, 5 July: 13:30 - 16:30

Main Auditorium

 **Hyperparameter Optimization for Deep Learning Models Using High Performance Computing**
Eric Wulff
Tue, 9 July: 13:30 - 15:30

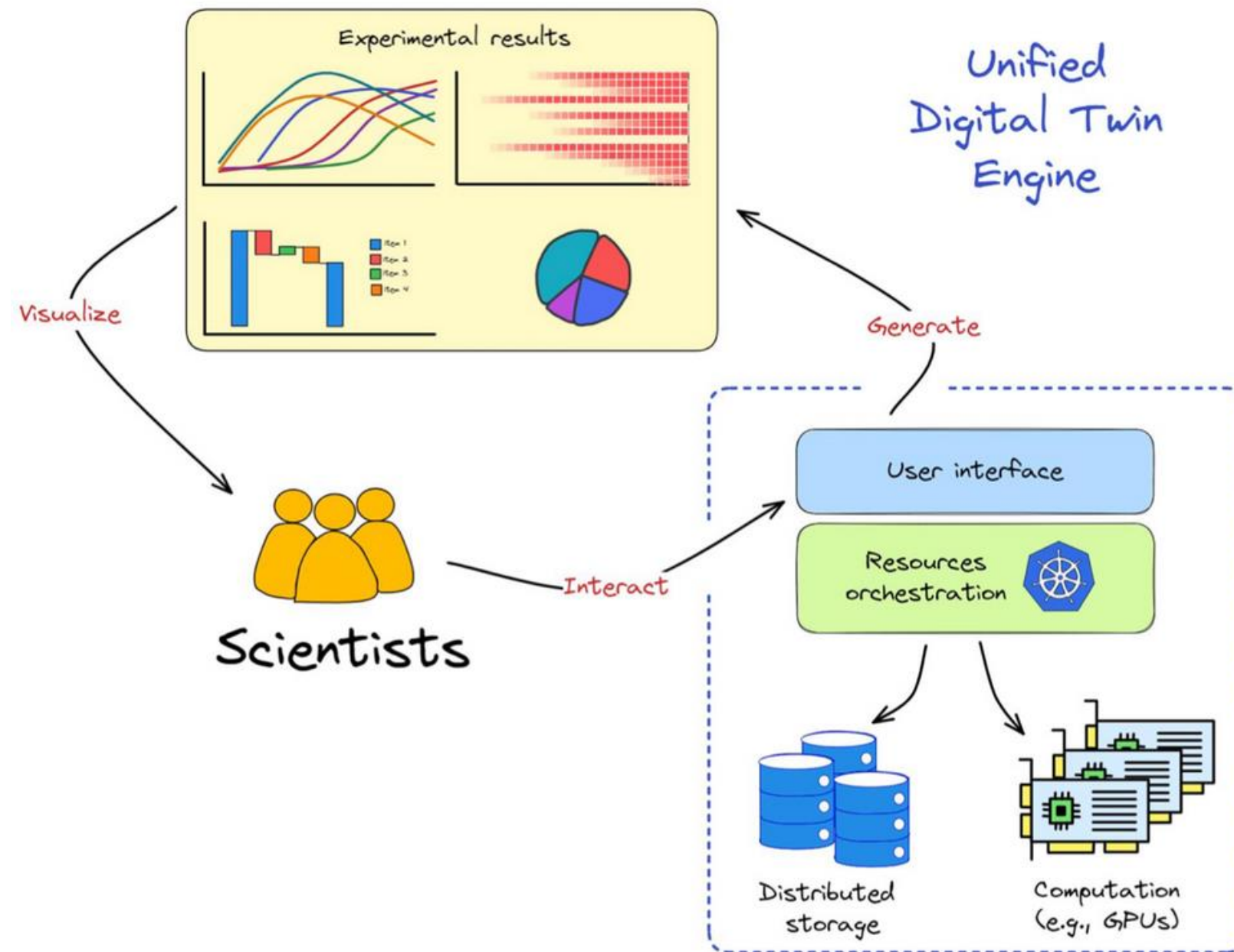
 **Hands-on lecture on reinforcement learning**
Matteo Bunino
Thu, 11 July: 13:30 - 15:30

 **ML in DAQ and trigger systems**
Thomas Owen James
Tue, 16 July: 14:30 - 15:30

 **High Performance Computing**
David Southwick
Thu, 18 July: 13:30 - 15:30

Digital Twins

We participate to EC project interTwin, and ECMWF's EMPP



InterTwin use cases

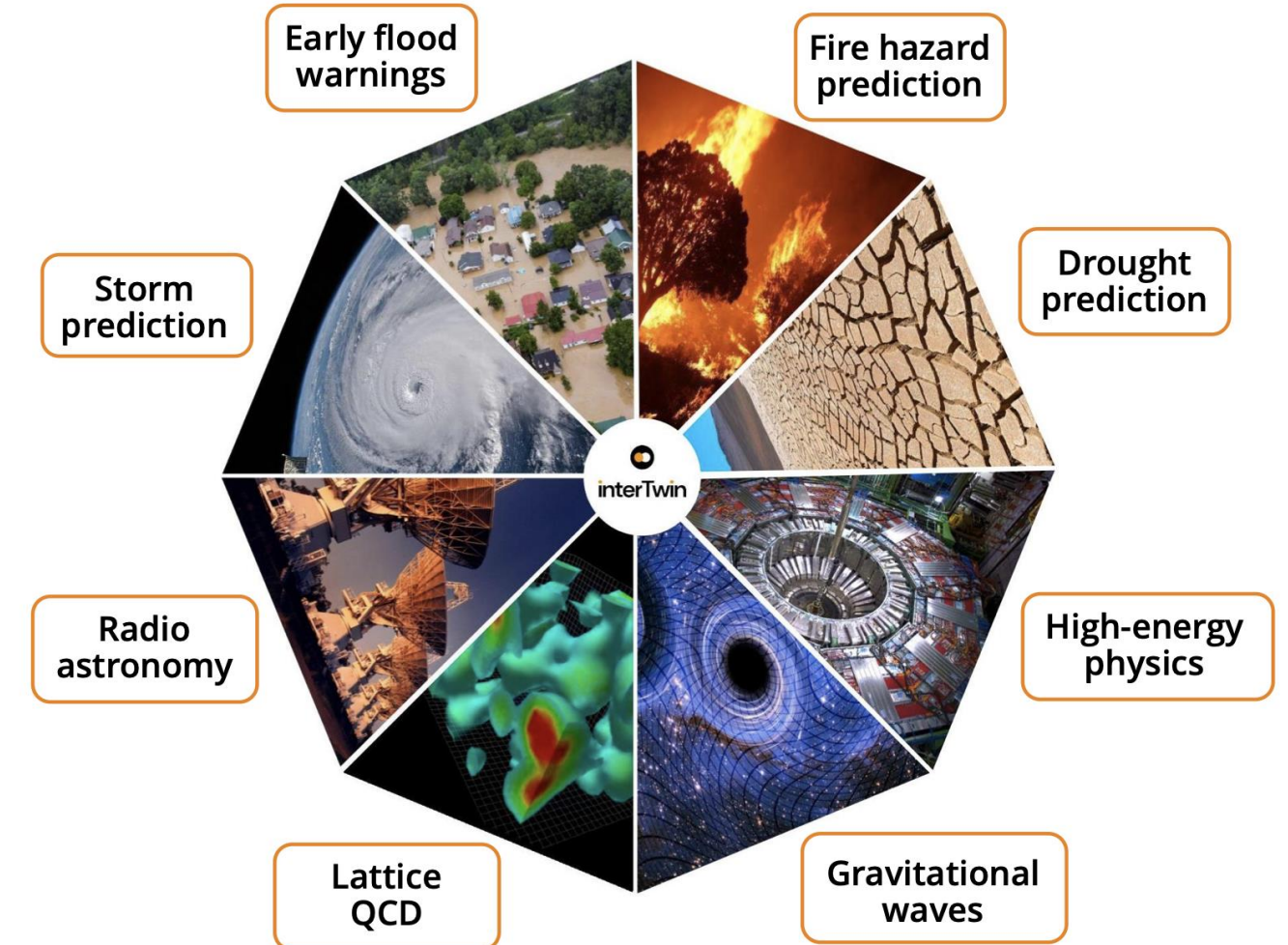




Image courtesy of [Alexander Zochbauer et al.](#)

Emerging technologies


Proposed lectures

-  **Foundation models: from the transformer to ChatGPT, and beyond.
Prompt engineering?**
Sofia Vallecorsa
Fri, 26 July: 13:30 - 15:30

-  **Digital Twins: introduction and EO use cases (EMPP)**
Alexander Zoechbauer & Kalliopi Tsolaki
Mon, 29 July: 13:30 - 15:30

Quantum computing

Proposed lectures

 **Basics of quantum computing**
Ema Puljak
Tue, 30 July: 13:30 - 14:30

 **Quantum computing hands-on**
Giulio Croгнаletti
Tue, 30 July: 14:30 - 15:30

 **Quantum Optimization and Quantum Machine Learning**
Carla Sophie Rieger
Tue, 30 July: 15:30 - 17:00

 **Quantum inspired algorithm: Tensor Networks**
Ema Puljak + Francesco Di Marcantonio
Wed, 31 July: 13:30 - 15:00

 **Software engineering/Quantum Kernels**
Roman Wixinger
Wed, 31 July: 15:00 - 16:30

Movie night and evening lecture

Proposed lectures

 **Physics-based deep learning**
Peter Kicsiny
Mon, 15 July: 17:00 - 18:00

 **Movie night: “Particle Fever”**
Mark Levinson
Mon, 15 July: 19:00 - 21:00

Main Auditorium

