

# Closing remarks



15<sup>th</sup> Inverted CERN School of Computing

15 – 18 April 2024

CERN, Geneva, Switzerland



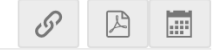
# Inverted CERN School of Computing 2024

| Monday, 15 April 2024                                                                                                     | Tuesday, 16 April 2024                                                                                               | Wednesday, 17 April 2024                                                                                   | Thursday, 18 April 2024                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 09:00 Opening ceremony                                                                                                    | 09:00 The perfectly parallel program: Architectures for hardware acceleration and heterogeneous computing (1/2)      | 09:00 Computer Networks in HEP (1/2) - Spyridon Trigazis (CERN)                                            | 09:00 Intro into Networking for HPC - Vlad-Andrei Badoiu (University Politehnica of Bucharest)                 |
| 09:20 A Practical Guide to Modern Natural Language Processing - Cristian Schusztter (CERN)                                | 10:00 The perfectly parallel program: Design philosophy for parallel programming (2/2) - Zenny Wettersten (CERN)     | 10:00 Computer Networks in HEP (2/2) - Spyridon Trigazis (CERN)                                            | 10:05 IPv6. Are we there yet? - Vlad Nastase (University POLITEHNICA Bucharest)                                |
| 10:20 Coffee Break                                                                                                        | 11:00 Coffee Break                                                                                                   | Exceptionally IT Amphi                                                                                     |                                                                                                                |
| 10:45 Functional programming (and why it's relevant for HEP computing) - Florina de Geus (CERN/University of Twente (NL)) | 11:30 Unraveling Grid Computing: From Basics to WLCG - Robin Hofsaess (KIT - Karlsruhe Institute of Technology (DE)) |                                                                                                            |                                                                                                                |
| 11:50 From Text to Threads: Large Language Models and their impact on the HEP community                                   | 12:30 Lunch                                                                                                          | 12:30 Lunch                                                                                                | 11:05 Coffee Break                                                                                             |
| 12:50 Lunch                                                                                                               | 13:45 Exercise: Functional programming (and why it's relevant for HEP computing) (1/2)                               | 13:45 Advanced git course: How to git good! (1/2) - Simone Rossi Tisbeni (Universita e INFN, Bologna (IT)) | 11:30 Exercise: The perfectly parallel program - Zenny Wettersten (CERN)                                       |
| 14:00 GPU Programming Made Easy with CuPy                                                                                 | 14:45 Exercise: Functional programming (and why it's relevant for HEP computing) (2/2)                               | 14:45 Advanced git course: How to git good! (2/2) - Simone Rossi Tisbeni (Universita e INFN, Bologna (IT)) | 12:30 Lunch                                                                                                    |
| 15:05 Why do machines learn? Introduction to fundamentals and common misconceptions in ML                                 | 15:45 Coffee Break                                                                                                   | 15:45 Coffee Break                                                                                         | 13:45 Exercise: Computer Networks in HEP - Spyridon Trigazis (CERN)                                            |
| 16:05 Coffee Break                                                                                                        | 16:15 Exercise: Unraveling Grid Computing: From Basics to WLCG                                                       | 16:15 Exercise: Generative Machine Learning in HEP: Simulation and beyond                                  | 14:45 Coffee Break                                                                                             |
| 16:30 Exercise: A Practical Guide to Modern Natural Language Processing - Cristian Schusztter (CERN)                      |                                                                                                                      |                                                                                                            | 15:15 Exercise: Advanced git course: How to git good! - Simone Rossi Tisbeni (Universita e INFN, Bologna (IT)) |

- Overview
- Timetable
- Speakers
- Zoom room
- Register now!**
- How to get to CERN
- CSC portal website
- Privacy notice
- More information about the iCSC
- CERN maps
- CERN Maps Application

CERN School of Computing  
✉ Computing.School@cer...

## A Practical Guide to Modern Natural Language Processing



📅 15 Apr 2024, 09:00  
🕒 1h  
📍 31/3-004 - IT Am...

Lecture

### Speaker

👤 Cristian Schusztzer (C...)

### Description

From its humble beginnings in the 1950s, this lecture offers a comprehensive yet accessible journey through the history of Natural Language Processing (NLP). We'll explore a few essential concepts, practical applications, and emerging trends within the field, along with the mathematics needed to unravel these tools. At the end of this lecture, you should be equipped with a solid understanding of the potential and inner workings of Natural Language Processing techniques, which you'll try out during the session.

### 📎 Presentation materials

- 📄 A Practical Guide to Modern Natural Language Processing.pdf
- 🔗 Recording
- 🔗 Video preview



# Thank you to our lecturers!



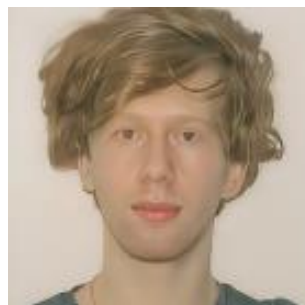
Bernardo Abreu Figueiredo  
Karlsruhe HKA



Pratik Jawahar  
University of Manchester



Spyridon Trigazis  
CERN



Vlad-Andrei Badoiu  
University Politehnica  
Bucharest



Vlad Nastase  
University Politehnica  
Bucharest



Andrea Valenzuela Ramirez  
CERN



Florine de Geus  
CERN



Simone Rossi Tisbeni  
Universita e INFN  
Bologna



Francesco Vaselli  
Scuola Normale Superiore  
INFN, Pisa



Robin Hofsaess  
KIT



Cristian Schusztter  
CERN



Zenny Jovi Joestar Wettersten  
CERN

# Thank you to the mentors!

- **This year's mentors:**
  - Andrei Gheata
  - Stephan Hageboeck
  - Pere Mato
  - Alberto Pace
  - Danilo Piparo
  - Sebastien Ponce
  - Toni Sculac
  - Are Strandlie
  - Sofia Vallecorsa

## exercise.ipynb



the data. We are going to use just a subset of the features to reduce the complexity of the problem, and load 1M jets to validation/test. We are going to plot some histograms of the features to better understand what we are talking about.

```
load the data taking only some of the features and dividing into reco (target) and gen (input)
factor():
__(self, data_path, n_samples=None):
data = np.load(data_path, allow_pickle=True)
n_samples = n_samples
data = self.data[:n_samples]
reco_features = ['btag', 'pt', 'phi', 'eta', 'N_const', 'c
reco = self.data[:, [5, 6, 7, 8, 10, 19]]
gen_features = ["pt", "eta", "phi", "E", "flavour", "muon
gen = self.data[:, [0, 1, 2, 3, 4, 9]]
mapse flavour to 3 categories: 0 (light), 1 (charm)
gen[:, 4] = np.abs(self.gen[:, 4])
gen[:, 4] = np.where(self.gen[:, 4]
gen[:, 4] = np.where(self.gen[:, 4]
gen[:, 4] = np.where(self.gen[:, 4]
gen[:, 4] = np.where(self.gen[:, 4]
gen[:, 4] = np.where(self.gen[:, 4]
gen[:, 4] = np.where(self.gen[:, 4]
```

```
to(self):
```

- CERN maps
- CERN Maps Application
- CERN School of Computing**
- Computing.School@cer...



15 - 18

**Starts** 15 Apr 2024, 09:00  
**Ends** 18 Apr 2024, 18:00  
 Europe/Zurich

317... amphitheatre  
 Go to...

Alberto Pace  
 Kristina Gunne  
 Andrzej Nowicki

School photos



Powered by Indico v3.3.2-pre

[Help](#) | [Contact](#) | [Terms and conditions](#) | [URL Shortener](#) | [Privacy](#)

# This school was brought to you by...



Kristina GUNNE  
*admin manager*



Alberto PACE  
*the director*



Andrzej NOWICKI  
*tech manager*



# See you at the next schools!




**15 - 18 April 2024**

## iCSC 2024

The 15<sup>th</sup> edition of the Inverted School will take place at CERN and online from 15 to 18 April 2024.

Registration is open now!



**9 - 15 June 2024**  
Belgrade, Serbia

**TODAY**  
**tCSC 2024**

The 14<sup>th</sup> edition of the Thematic School will take place at ITS, Belgrade, Serbia from 9 to 15 June 2024.

Applications are now closed.



**8 - 21 September 2024**  
Hamburg, Germany

## CSC 2024

The 45<sup>th</sup> edition of the Main School will take place at DESY, Hamburg, Germany from 8 to 21 September 2024.

Applications deadline extended until 15 April!



## tCSC 2024-2

15<sup>th</sup> Thematic School on [Machine Learning](#) for Data Analysis and accelerator applications

13-19 October 2024, Split, Croatia



## CSC 2024

### On IT services

4-8 November 2024  
Ferney-Voltaire

## sCSC on Security ?

Postponed to early 2025

# Inverted CERN School of Computing 2024

| Monday, 15 April 2024                                                                                                     | Tuesday, 16 April 2024                                                                                               | Wednesday, 17 April 2024                                                                                   | Thursday, 18 April 2024                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 09:00 Opening ceremony                                                                                                    | 09:00 The perfectly parallel program: Architectures for hardware acceleration and heterogeneous computing (1/2)      | 09:00 Computer Networks in HEP (1/2) - Spyridon Trigazis (CERN)                                            | 09:00 Intro into Networking for HPC - Vlad-Andrei Badoiu (University Politehnica of Bucharest)                 |
| 09:20 A Practical Guide to Modern Natural Language Processing - Cristian Schusztzer (CERN)                                | 10:00 The perfectly parallel program: Design philosophy for parallel programming (2/2) - Zenny Wettersten (CERN)     | 10:00 Computer Networks in HEP (2/2) - Spyridon Trigazis (CERN)                                            | 10:05 IPv6. Are we there yet? - Vlad Nastase (University POLITEHNICA Bucharest)                                |
| 10:20 Coffee Break                                                                                                        | 11:00 Coffee Break                                                                                                   | 11:00 Coffee Break                                                                                         | 11:05 Coffee Break                                                                                             |
| 10:45 Functional programming (and why it's relevant for HEP computing) - Florina de Geus (CERN/University of Twente (NL)) | 11:30 Unraveling Grid Computing: From Basics to WLCG - Robin Hofsaess (KIT - Karlsruhe Institute of Technology (DE)) | 11:30 Generative Machine Learning in HEP: Simulation and beyond                                            | 11:30 Exercise: The perfectly parallel program - Zenny Wettersten (CERN)                                       |
| 11:50 From Text to Threads: Large Language Models and their impact on the HEP community                                   | 12:30 Lunch                                                                                                          | 12:30 Lunch                                                                                                | 12:30 Lunch                                                                                                    |
| 12:50 Lunch                                                                                                               | 13:45 Exercise: Functional programming (and why it's relevant for HEP computing) (1/2)                               | 13:45 Advanced git course: How to git good! (1/2) - Simone Rossi Tisbeni (Universita e INFN, Bologna (IT)) | 13:45 Exercise: Computer Networks in HEP - Spyridon Trigazis (CERN)                                            |
| 14:00 GPU Programming Made Easy with CuPy                                                                                 | 14:45 Exercise: Functional programming (and why it's relevant for HEP computing) (2/2)                               | 14:45 Advanced git course: How to git good! (2/2) - Simone Rossi Tisbeni (Universita e INFN, Bologna (IT)) | 14:45 Coffee Break                                                                                             |
| 15:05 Why do machines learn? Introduction to fundamentals and common misconceptions in ML                                 | 15:45 Coffee Break                                                                                                   | 15:45 Coffee Break                                                                                         | 15:15 Exercise: Advanced git course: How to git good! - Simone Rossi Tisbeni (Universita e INFN, Bologna (IT)) |
| 16:05 Coffee Break                                                                                                        | 16:15 Exercise: Unraveling Grid Computing: From Basics to WLCG                                                       | 16:15 Exercise: Generative Machine Learning in HEP: Simulation and beyond                                  |                                                                                                                |
| 16:30 Exercise: A Practical Guide to Modern Natural Language Processing - Cristian Schusztzer (CERN)                      |                                                                                                                      |                                                                                                            |                                                                                                                |