
CERN


CERN
School of Computing


TARTU ÜLIKOOL
1632
UNIVERSITY OF TARTU


CERN

Welcome

School pre-opening briefing

Alberto Pace, school director

Who am I ? Alberto – your school director

- Education: Electronic Engineering (Politecnico di Milano)
- I have led many groups and various sections at CERN, in the area of general infrastructure (Mail, Web, Desktop), Storage and currently Computing. I have many years experience in computing services, software engineering, accelerator control and accelerator operation.
- I have been teaching at the University of Lausanne the “Programming” course to master students and at the CSC on network protocols, grid and now data technologies …
- I will be with you for the next 2 weeks.

The Organizing team

- … from CERN

Kristina Gunne

Jarek Polok

Andrzej Nowicki

Alberto Pace

- The local organisers from Tartu University

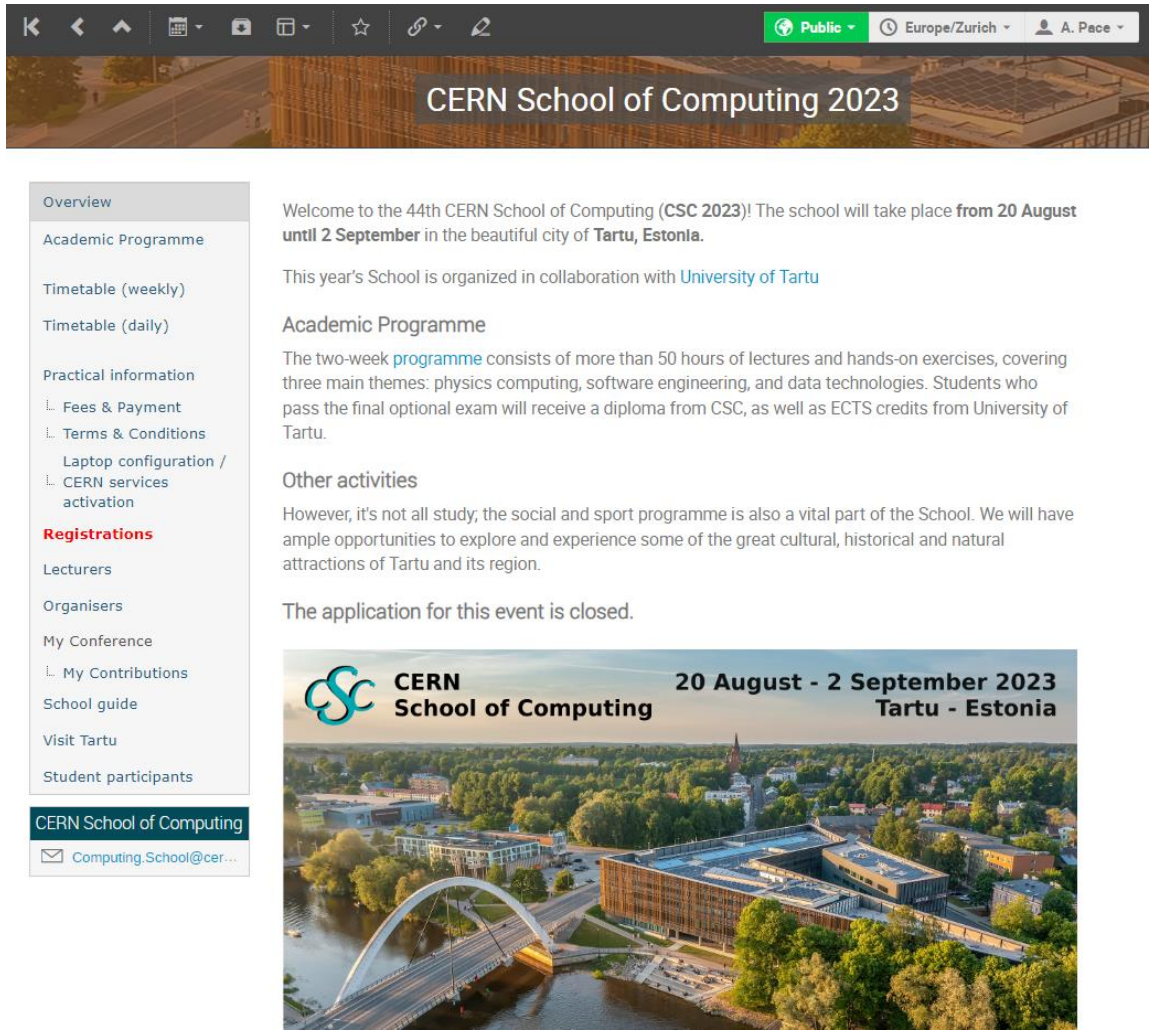
Margit Meiesaar

Veronika Zadin

Tauno Tiirats

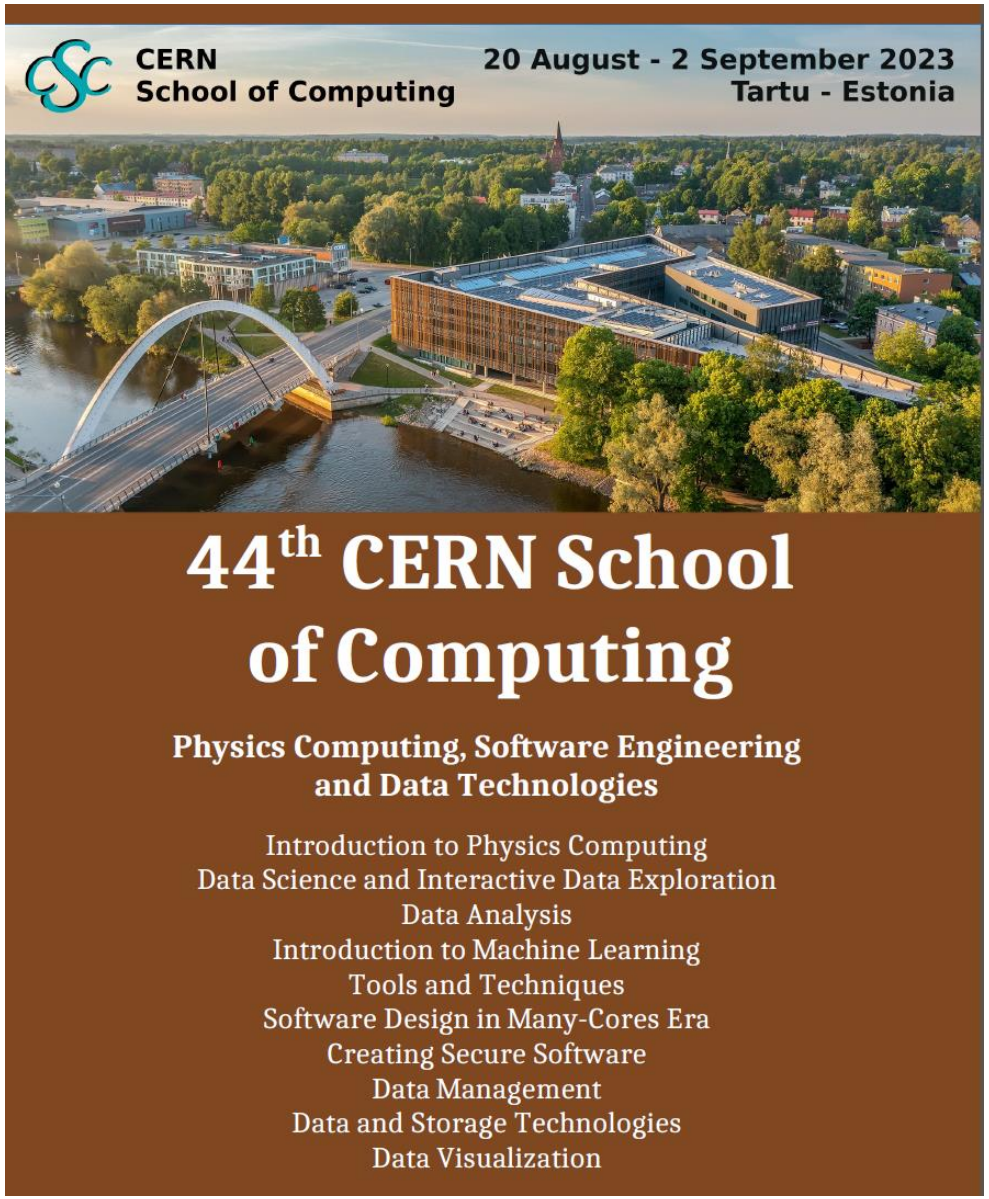
The School site is on indico

- https://indico.cern.ch/event/1254984/
- Check it regularly for updates



School booklet

- Printed version for those who asked for it
- Electronic version (PDF) Linked from school main page on Indico
- Contains pictures and short biographies of all participants



WhatsApp group

- Unofficial communication channel
- We recommend you to join the group
- Autojoin link:
  - https://chat.whatsapp.com/JFIqj6VSjqHGFHLHQapEN2

School rules …

School rule #1

- **Participate**
  - Attendance at all lectures and exercises is mandatory
  - You should attend all meals and coffee breaks
  - Taking part in social and sports events is optional
    - The social and sports programme is part of the school …
    - You must let us know whether you participate or not

School rule #2

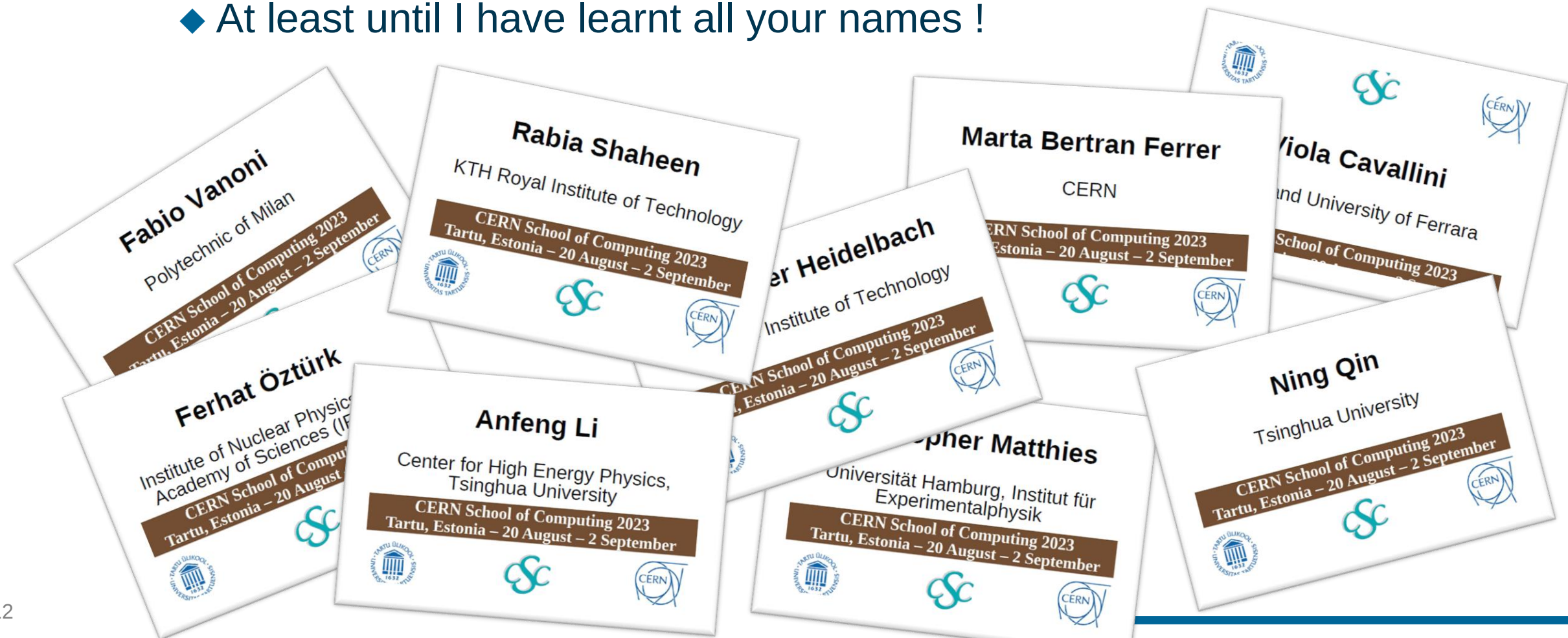
- **Be on time**
- Check what the schedule says:
  - “Lecture starts at 8.45” => You must be in the room before 8.45
  - The same rule applies to all activities
- If you’re late, we won’t wait

https://www.youtube.com/watch?v=1dZveoBfiww

Spaceballs, Mel Brooks, 1987

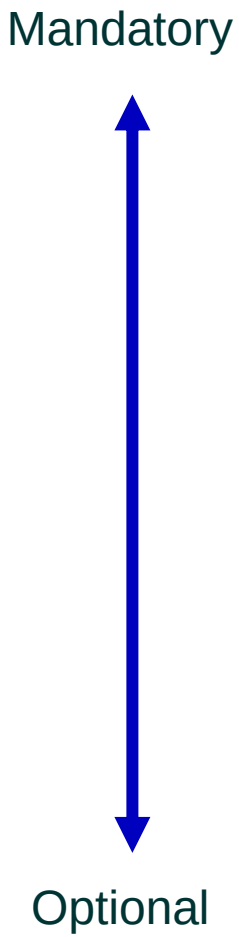
School rule #3

- **Wear your badge**
  - At least until I have learnt all your names !



The school learning process

- Learning process
  - Lectures
  - Exercises
  - Exam
- Meet special persons,
  Build trusts with colleagues across the world
  - Lunches, dinners, coffee breaks, evenings
  - Excursions
  - Music events
  - Sport programme



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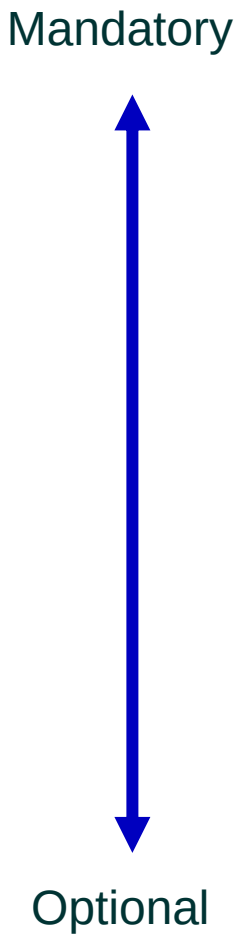
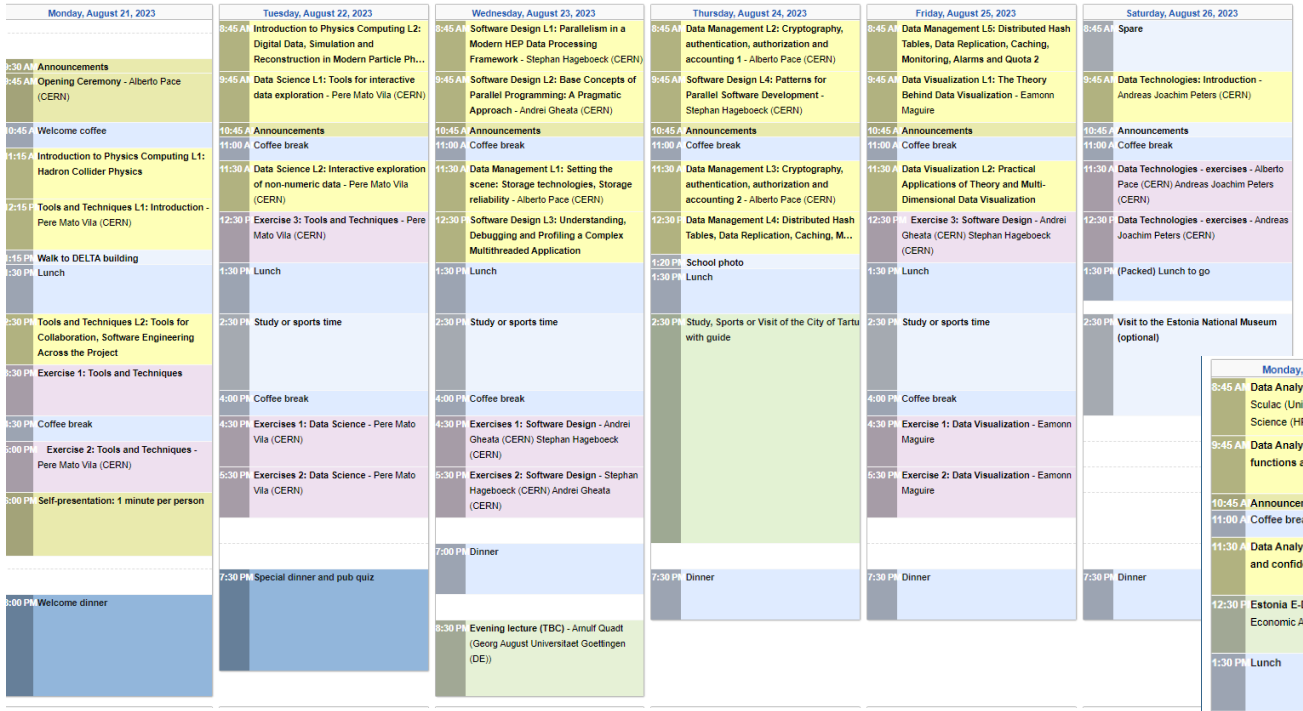
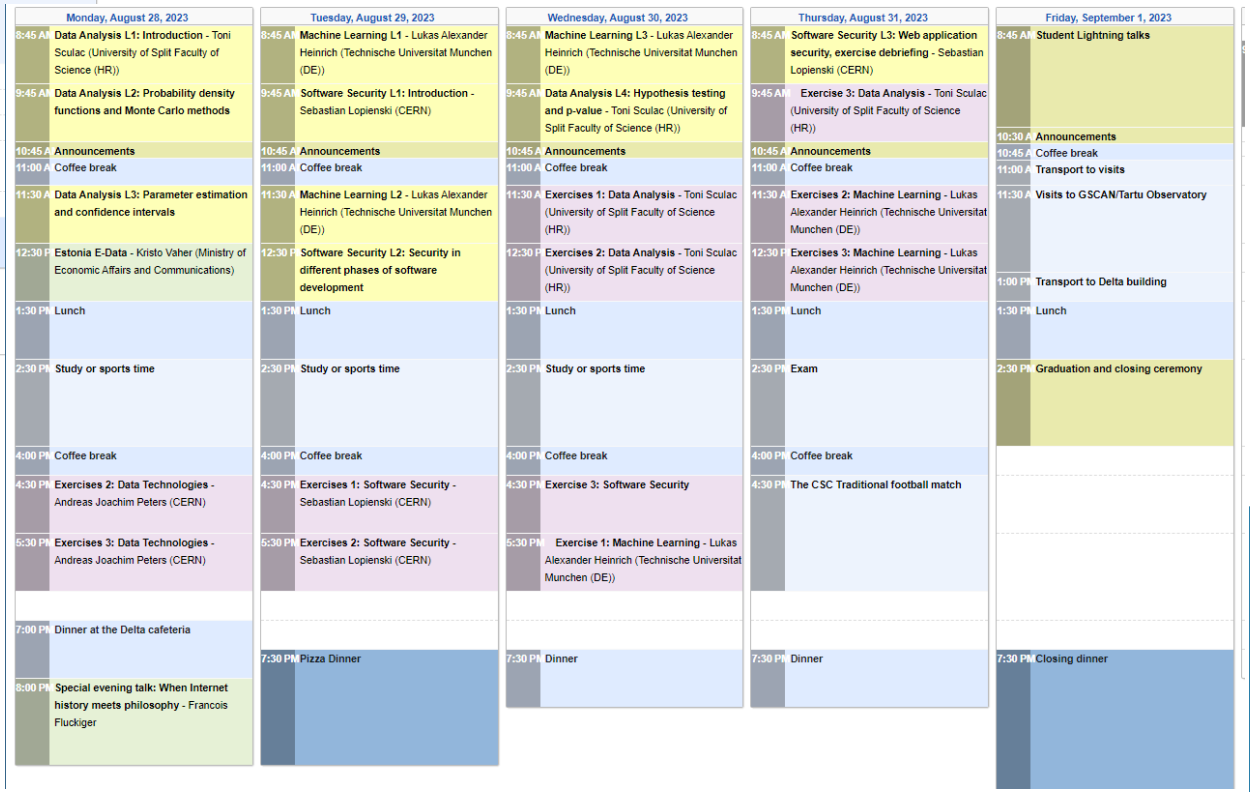


The tuition programme



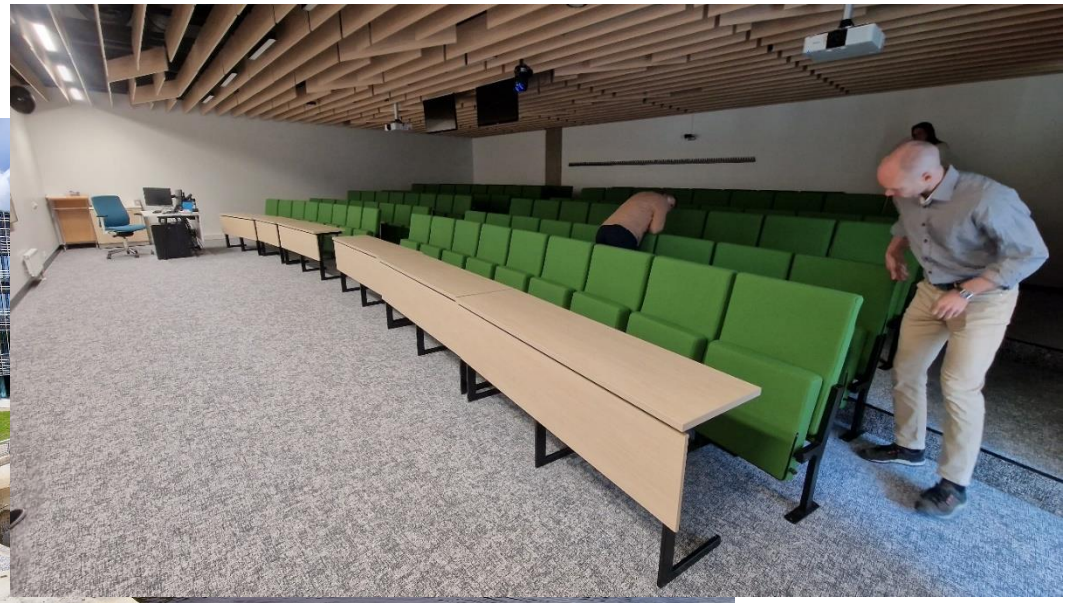
Monday, August 21, 2023	Tuesday, August 22, 2023	Wednesday, August 23, 2023	Thursday, August 24, 2023	Friday, August 25, 2023	Saturday, August 26, 2023
Announcements	Introduction to Physics Computing L2: Digital Data, Simulation and Reconstruction in Modern Particle Ph…	Software Design L1: Parallelism in a Modern HEP Data Processing Framework - Stephan Hageboeck (CERN)	Data Management L2: Cryptography, authentication, authorization and accounting 1 - Alberto Pace (CERN)	Data Management L5: Distributed Hash Tables, Data Replication, Caching, Monitoring, Alarms and Quota 2	Spare
Opening Ceremony - Alberto Pace (CERN)	Data Science L1: Tools for interactive data exploration - Pere Mato Vila (CERN)	Software Design L2: Base Concepts of Parallel Programming: A Pragmatic Approach - Andrei Gheata (CERN)	Software Design L4: Patterns for Parallel Software Development - Stephan Hageboeck (CERN)	Data Visualization L1: The Theory Behind Data Visualization - Eamonn Maguire	Data Technologies: Introduction - Andreas Joachim Peters (CERN)
Welcome coffee	Announcements	Announcements	Announcements	Announcements	Announcements
Introduction to Physics Computing L1: Hadron Collider Physics	Coffee break	Coffee break	Coffee break	Coffee break	Coffee break
Tools and Techniques L1: Introduction - Pere Mato Vila (CERN)	Data Science L2: Interactive exploration of non-numeric data - Pere Mato Vila (CERN)	Data Management L1: Setting the scene: Storage technologies, Storage reliability - Alberto Pace (CERN)	Data Management L3: Cryptography, authentication, authorization and accounting 2 - Alberto Pace (CERN)	Data Visualization L2: Practical Applications of Theory and Multi-Dimensional Data Visualization	Data Technologies - exercises - Alberto Pace (CERN) Andreas Joachim Peters (CERN)
Walk to DELTA building	Exercise 3: Tools and Techniques - Pere Mato Vila (CERN)	Software Design L3: Understanding, Debugging and Profiling a Complex Multithreaded Application	Data Management L4: Distributed Hash Tables, Data Replication, Caching, M…	Exercise 3: Software Design - Andrei Gheata (CERN) Stephan Hageboeck (CERN)	Data Technologies - exercises - Andreas Joachim Peters (CERN)
Lunch	Lunch	Lunch	School photo	Lunch	(Packed) Lunch to go
Tools and Techniques L2: Tools for Collaboration, Software Engineering Across the Project	Study or sports time	Study or sports time	Lunch	Study or sports time	Visit to the Estonia National Museum (optional)
Exercise 1: Tools and Techniques	Coffee break	Coffee break	Study, Sports or Visit of the City of Tartu with guide	Coffee break	
Coffee break	Exercises 1: Data Science - Pere Mato Vila (CERN)	Exercises 1: Software Design - Andrei Gheata (CERN) Stephan Hageboeck (CERN)		Exercise 1: Data Visualization - Eamonn Maguire	
Exercise 2: Tools and Techniques - Pere Mato Vila (CERN)	Exercises 2: Data Science - Pere Mato Vila (CERN)	Exercises 2: Software Design - Stephan Hageboeck (CERN) Andrei Gheata (CERN)		Exercise 2: Data Visualization - Eamonn Maguire	
Self-presentation: 1 minute per person		Dinner	Dinner	Dinner	Dinner
Welcome dinner	Special dinner and pub quiz	Evening lecture (TBC) - Arnulf Quadt (Georg August Universitaet Goettingen (DE))			



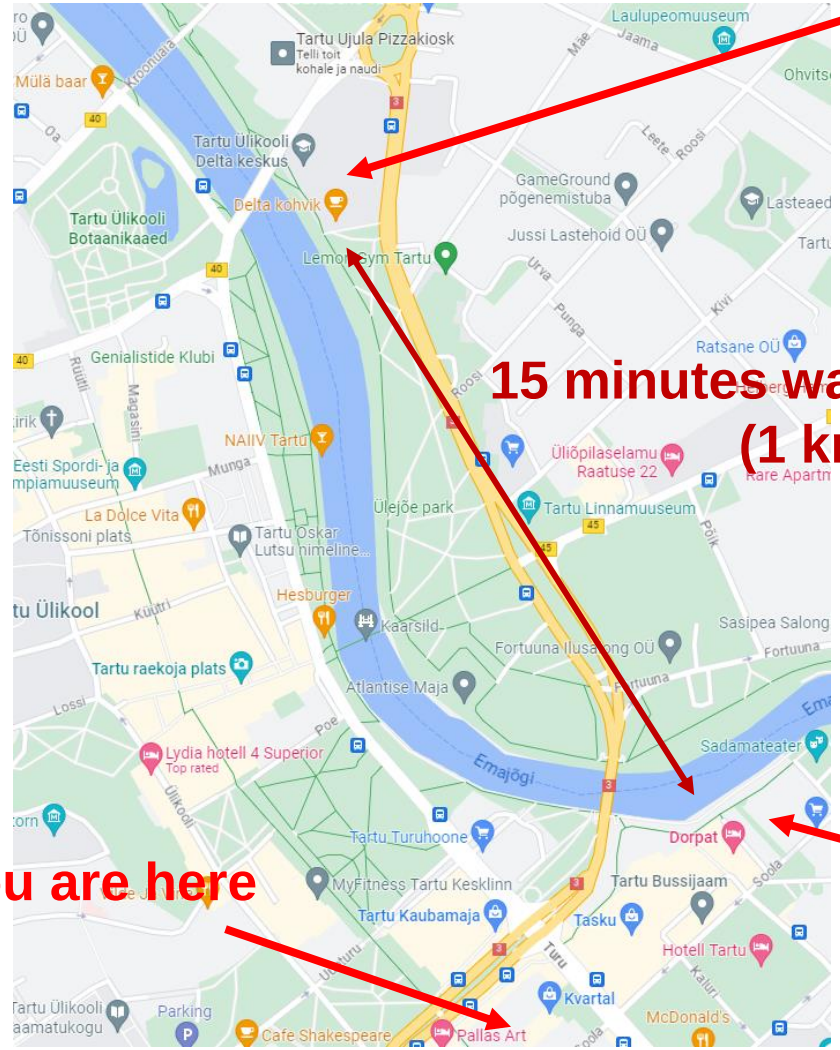
Monday, August 28, 2023	Tuesday, August 29, 2023	Wednesday, August 30, 2023	Thursday, August 31, 2023	Friday, September 1, 2023
Data Analysis L1: Introduction - Toni Sculac (University of Split Faculty of Science (HR))	Machine Learning L1 - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))	Machine Learning L3 - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))	Software Security L3: Web application security, exercise debriefing - Sebastian Lopienski (CERN)	Student Lightning talks
Data Analysis L2: Probability density functions and Monte Carlo methods	Software Security L1: Introduction - Sebastian Lopienski (CERN)	Data Analysis L4: Hypothesis testing and p-value - Toni Sculac (University of Split Faculty of Science (HR))	Exercise 3: Data Analysis - Toni Sculac (University of Split Faculty of Science (HR))	Announcements
Announcements	Announcements	Announcements	Announcements	Coffee break
Coffee break	Coffee break	Coffee break	Coffee break	Transport to visits
Data Analysis L3: Parameter estimation and confidence intervals	Machine Learning L2 - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))	Exercises 1: Data Analysis - Toni Sculac (University of Split Faculty of Science (HR))	Exercises 2: Machine Learning - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))	Visits to GSCAN/Tartu Observatory
Estonia E-Data - Kristo Vaher (Ministry of Economic Affairs and Communications)	Software Security L2: Security in different phases of software development	Exercises 2: Data Analysis - Toni Sculac (University of Split Faculty of Science (HR))	Exercises 3: Machine Learning - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))	Transport to Delta building
Lunch	Lunch	Lunch	Lunch	Lunch
Study or sports time	Study or sports time	Study or sports time	Exam	Graduation and closing ceremony
Coffee break	Coffee break	Coffee break	Coffee break	
Exercises 2: Data Technologies - Andreas Joachim Peters (CERN)	Exercises 1: Software Security - Sebastian Lopienski (CERN)	Exercise 3: Software Security	The CSC Traditional football match	
Exercises 3: Data Technologies - Andreas Joachim Peters (CERN)	Exercises 2: Software Security - Sebastian Lopienski (CERN)	Exercise 1: Machine Learning - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))		
Dinner at the Delta cafeteria	Pizza Dinner	Dinner	Dinner	Closing dinner
Special evening talk: When Internet history meets philosophy - Francois Fluckiger				

The tuition location

Delta building

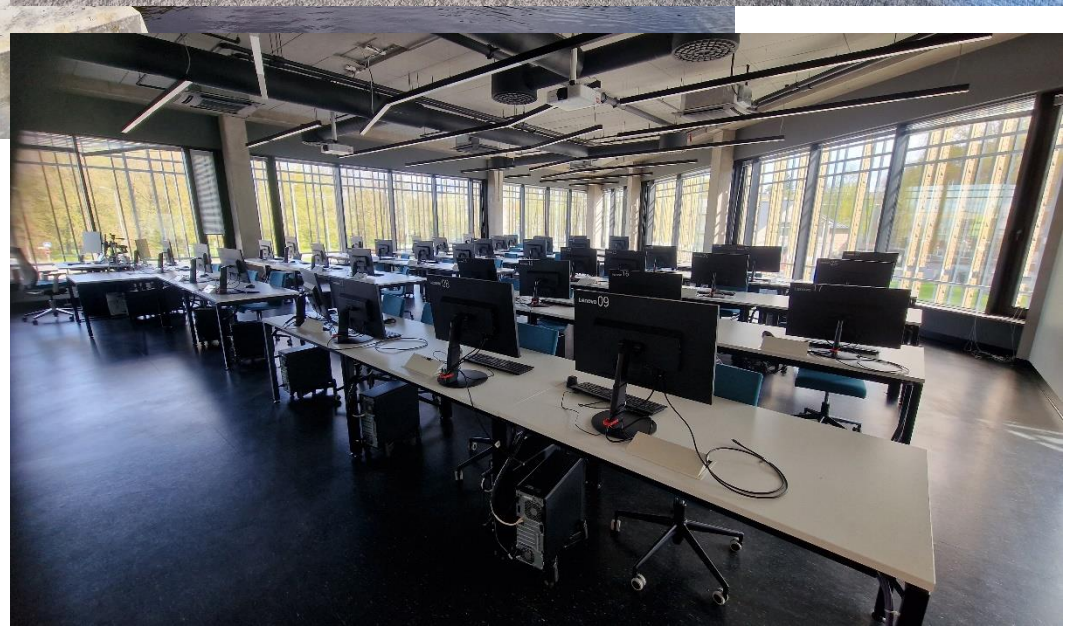


15 minutes walk
(1 km)



You are here

Hotel Dorpat



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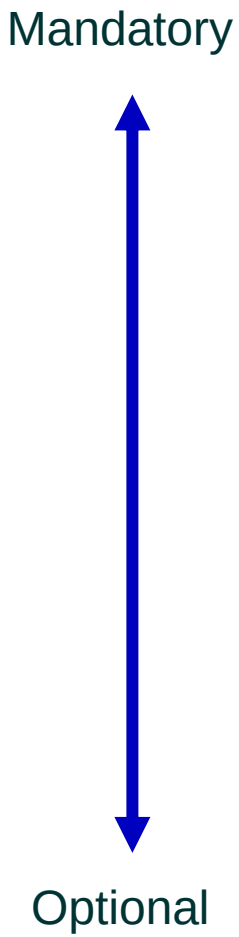

The School culture in “exercises”

- The school has an entire computing infrastructure for exercises. Remotely accessible to the students
  - The computing infrastructure is located at CERN
- Students work in pair (2-student teams). If possible:
  - 1 student with physics background
  - 1 student with computing background

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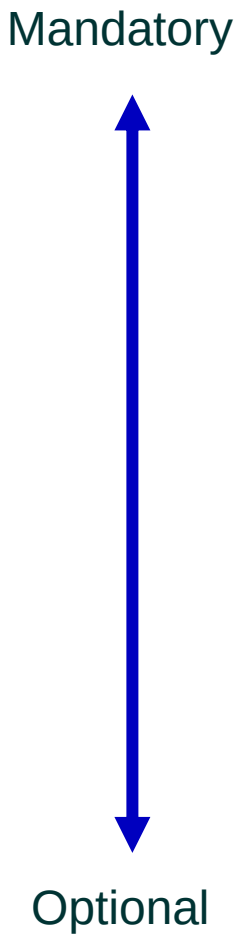

The exam

- A serious and difficult exam, which delivers the diploma
- Evaluate knowledge in two fields
  - Physics
  - Computing

An exam part of the learning process

Sample question

- The test statistic is usually a single number whose value ...
  - ... reflects an agreement between the data and the hypothesis.
  - ... is equivalent to the mean value of the data sample.
  - ... must be equal to the most probable value of the distribution in question.
  - ... is never larger than the difference between values of variances of two competing hypotheses.

An exam part of the learning process

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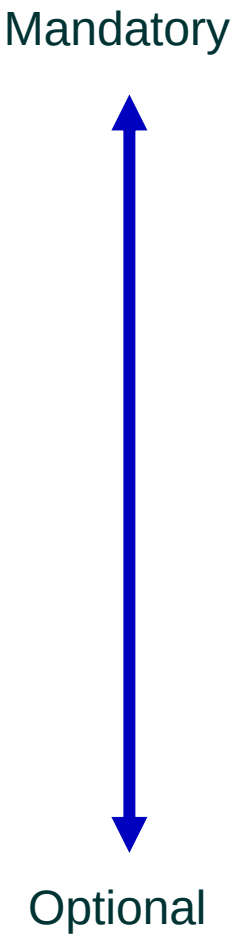


Lunch and Dinners

- Mix of students + lecturers
- Tables of 8 - 12 persons

(Optional) Social programme

- Excursions
  - Culture
  - History
  - Nature

- Social games

(Optional) Music events

- Many students have hidden talents
- Music values are universal across all cultures

Last school in Split …

Sten

Christof

Bernardo

Marcel

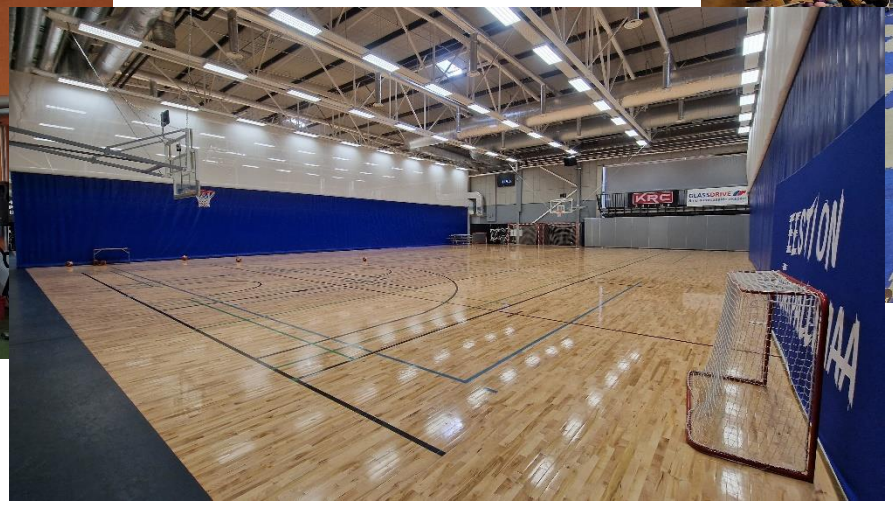
Optional Sports ….

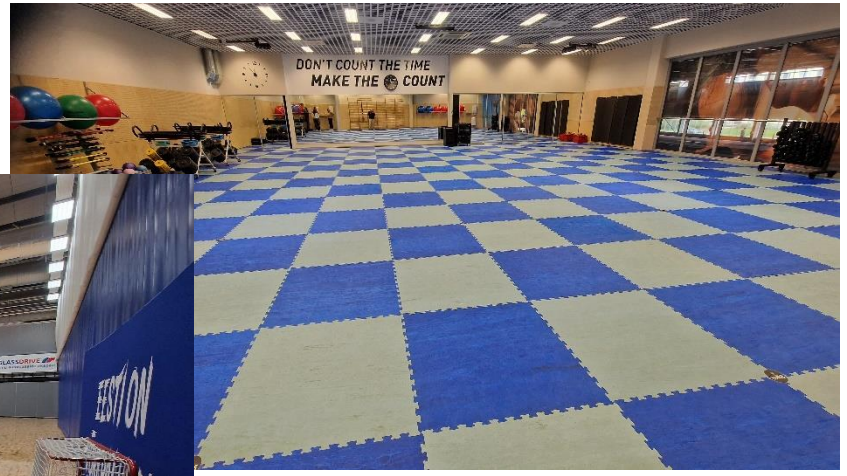
This year sport possibilities at the school

- Almost every day, after lunch there are 90 minutes of “study or sport time”
  - Your choice between studing or practicing / learning new sports
- Sports can be played at “Tartu Űlikooli Sportdihoone”, across the street from the lecture buildings

Opportunities in the sporthall

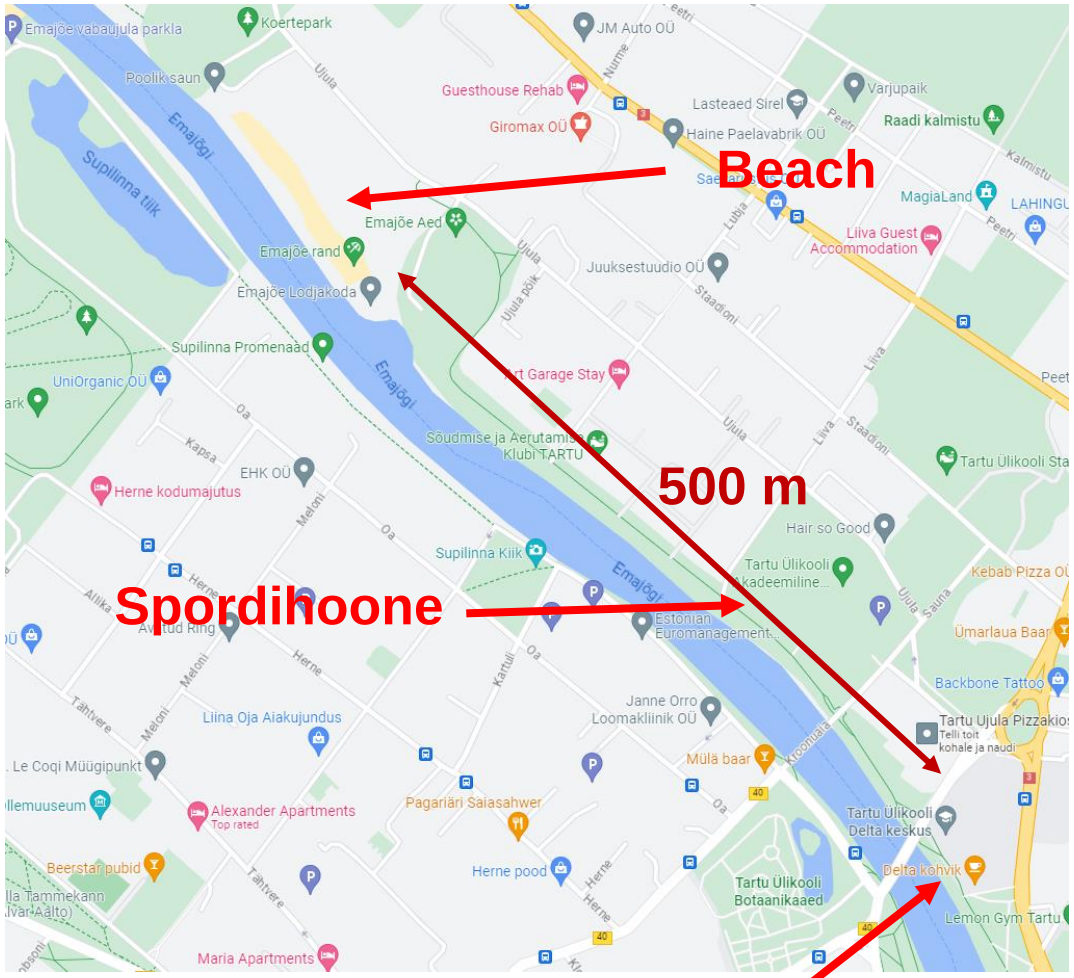
- Volleyball, badminton, basket, gym, step …
- balls and nets will be provided …
- Bring your own sport clothes and shoes **in the morning** as you will not have time to go back to the hotel





Other opportunities

- Swimming in the river Emajõgi
- 500 m (800 m walking) from Delta

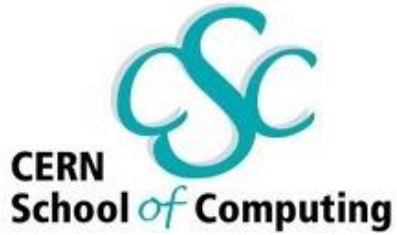


Other opportunities

- Farniente

CERN School of Computing 2023

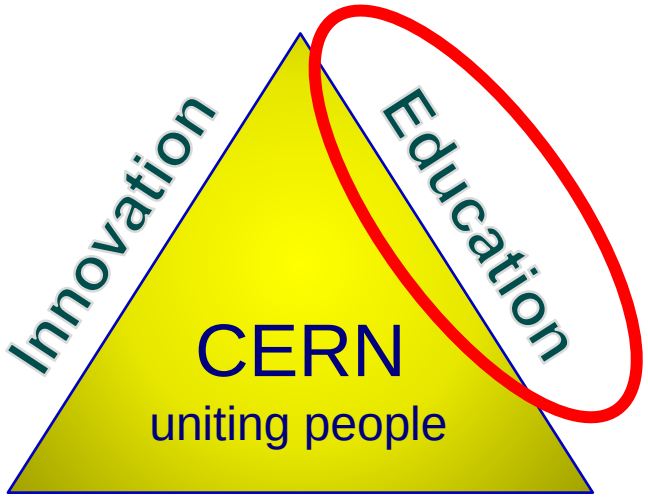
Tartu, Estonia



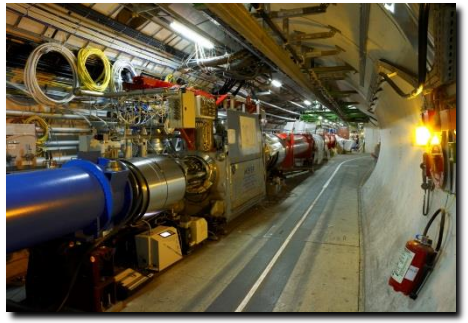
Welcome to the CERN School of Computing 2023

Alberto Pace, school director

CERN's mission



The CERN School of Computing is here …



Accelerating beams (accelerators)

Detecting particles (experiments)

Large-scale computing (Analysis)

Discovery

A school with a long history

- The school was created in 1970, 2023 is the 44th edition
- The school has visited 22 countries
  - all member states (except Bulgaria, Slovak Republic)
    + Croatia, Cyprus, India … and Estonia this year !
- 3145 students have followed the school
- This year
  - 135 applicants from 45 nationalities, from 82 institutes/universities
    - Algeria, Austria, Belgium, Brazil, Canada, China, Croatia, Ecuador, Egypt, Estonia, Germany, Greece, India, Iran, Italy, Jordan, Lebanon, Malaysia, Mexico, Morocco, Netherlands, Oman, Pakistan, Palestinian Territories, Peru, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Turkey, Uganda, Ukraine, United Kingdom, United States.
  - 69 students selected from 27 nationalities, 38 institutes (more later)

82 applicant Institutes, National Laboratories, Universities

AGH - University of Science and Technology, Albert Ludwigs University of Freiburg, American University of Beirut, Beirut Arab University, Cairo University, Center for High Energy Physics - Tsinghua University, Centre de Physique des Particules de Marseille (CPPM - France), CERN, Charles University in Prague, CNRS - IJCLab, Egypt-Japan University of Science and Technology (E-JUST), ENSIAS - UM5, ENSIAS - Mohammed V University in Rabat, ETH Zürich, Hassan II University Of Casablanca, Helsinki Institute of Physics, HEPHY, Ibn Tofail University, Indian Institute of Technology Bhubaneswar, INFN, Institute for Particle Physics and Astrophysics (IPA) - ETH Zurich, Institute for Research in Fundamental Sciences (IPM), Institute of Nuclear Physics Polish Academy of Sciences, Institute of Particle and Nuclear Physics - Charles University - Prague, Jan Kochanowski University, Jordan university of science and technology, Jožef Stefan Institute, Jozef Stefan Institute - University of Ljubljana, Karlsruhe Institute of Technology, KTH Royal Institute of Technology, Laser and Plasma Research Institute (LAPRI) - Shahid Beheshti University., Ledger, Lund University, Marmara University, Max Planck Institute for Iron Research, Max-Planck-Institut für Physik, Mohammed VI Polytechnic University, New York University - Abu Dhabi, Nicolaus Copernicus Astronomical Center - Warsaw, Polytechnic of Milan, Qassim University, Red Hat, Rheinische Friedrich-Wilhelms-Universität Bonn, RWTH Aachen University, Sapienza University of Rome, Science and Technology Facilities Council, Shahid Beheshti University, Sohar University, Southern Methodist University, STFC-ISIS Neutron and Muon Source, Suez Canal University, Techical University of Munich, Technische Universitaet Dortmund, The British University in Egypt, The Henryk Niewodniczański Institute of Nuclear Physics Polish Academy of Sciences., The Institute for Research in Fundamental Sciences (IPM), Tsinghua University, TU Wien, Uni Bonn, United Arab Emirates University, Universität Hamburg - Institut für Experimentalphysik, Universität Heidelberg, Université Saint-Joseph, University of Belgrade, University of Bern, University of California - Berkeley, University of Cape Town, University of Cincinnati, University of Ferrara, University of Geneva, University of Hamburg, University of Malaya (UM) - Malaysia, University of Milan, University of Moratuwa, University of Rome Tor Vergata, University of Sharjah, University of Tartu, University of Victoria, University of Virginia, University Politehnica of Bucharest, Utrecht University, Valoores.

Mandate and mission

- Create a *common culture* in *scientific computing* among young scientists and engineers involved *in particle physics or other sciences*, as a strategic direction to *promote mobility* and to facilitate the development of large computing-oriented *transnational projects*.
  - http://cern.ch/csc
- Participants come from worldwide laboratories and universities with typically 20 to 30 different nationalities
  - 61 different nationalities in the past 10 years.
  - http://cern.ch/csc/alumni

Bridging science and computing

- The unprecedented technological evolution in computing has profited directly to several scientific research projects, in particular in high energy physics
  - Computing is today the main strategy for many sciences to boost their research productivity
- It is nowadays essential that:
  - Scientists master computing technologies as the main tool for their research
  - Computer scientists understand the scientific domain of the investigation to deliver computing services that meet the needs of the research project

The CERN Schools of computing

- The Main School (this one)
  - Two weeks, ~ 60 participants
  - Multiple topics on scientific computing
- The Thematic schools
  - Goes more in depth on a particular topic
  - Smaller participation, shorter duration (one week), clear goals
  - This year school: between 20 and 30 participants
- The Inverted school
  - It is frequent to find among students real experts on specific topics, and the cumulated knowledge of the students exceeds the one of lecturers.
  - At the end of each school, we invite students to propose some lectures, and we organize an “inverted” school. *“Where students turn into teachers”*
  - In 2023, the 14th edition had 14 lecturers and more than hundred participants

An outreach opportunity

- For the local organizers

ΚΑΘΗΜΕΡΙΝΗ **ΚΑΒΑΛΑ**

ΚΑΘΗΜΕΡΙΝΗ ΕΦΗΜΕΡΙΔΑ ΤΗΣ ΚΑΒΑΛΑΣ

Χρόνος 41ος · Αριθμός Φύλλου 11097 Παρασκευή 11 Σεπτεμβρίου 2015 Τιμή φύλλου 0,50 EURO

Θερινό Σχολείο Ηλεκτρονικής με 75 μεταπτυχιακούς φοιτητές θα διοργανώσει το ΤΕΙ Καβάλας

Μεγάλη διοργάνωση, πολλαπλά τα κέρδη

SLOBODNA DALMACIJA

An outreach opportunity

- For CERN

The School Academic Dimension

- The school …
  - … is not a conference
  - … is not a place for lecturers to present their work, promote their projects
  - Does not replicate of common training available at home institutes, or in member state's universities
  - Does not deliver "technical training" courses

- Focus on **persistent knowledge**, less notions and knowhow

The school governance

- … is discussed at the School Advisory Committee
  - http://csc.web.cern.ch/advisory-committe
  - Includes several fulltime university professors from different countries
    - Currently: Belgium, Estonia, Germany, Croatia, Italy, Norway, Poland, Spain
  - Two meetings per year

The School Advisory Committee

Arnulf Quadt
Advisory Committee Chair, Programme Committee
Universität Göttingen

Alberto Pace
School Director, Advisory Committee , Programme Committee
CERN

Enrica Porcari
Advisory Committee, CERN IT Department Head
CERN

Kristina Gunne
School Administrative Manager, Advisory Committee
CERN

Jarek Polok
School Technical Manager, Advisory Committee
CERN

Frédéric Hemmer
Advisory Committee, Programme Committee
CERN

Sebastian Łopieński
Advisory Committee
CERN

Pere Mato
Advisory Committee, Programme Committee
CERN

Danilo Piparo
Advisory Committee, Programme Committee
CERN

Are Strandile
Advisory Committee, Programme Committee
CERN

Veronika Zadin
CSC 2023 Local Organising Committee
University of Tartu Institute of Technology

Tauno Tiirats
CSC 2023 Local Organising Committee
University of Tartu Institute of Technology

Margit Meiesaar
CSC 2023 Local Organising Committee
University of Tartu Institute of Technology

This year's school

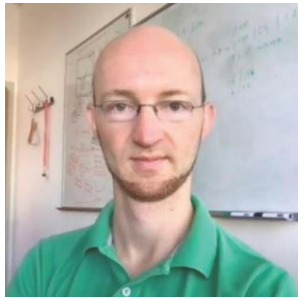
Academic Programme

- Physics Computing
  - Physics Computing 2h lectures
  - Data Science and Interactive Data Exploration 2h + 2h
  - Data Analysis 4h + 3h
  - Introduction to Machine Learning 3h + 3h
- Software Engineering
  - Tools and Techniques 2h + 3h
  - Software Design in the Many-Cores Era 4h + 3h
  - Creating Secure Software 3h + 3h
- Data Technologies
  - Data Management 5h lectures
  - Data and Storage Technologies 1h lecture 3h
  - Data Visualization 2h + 2h

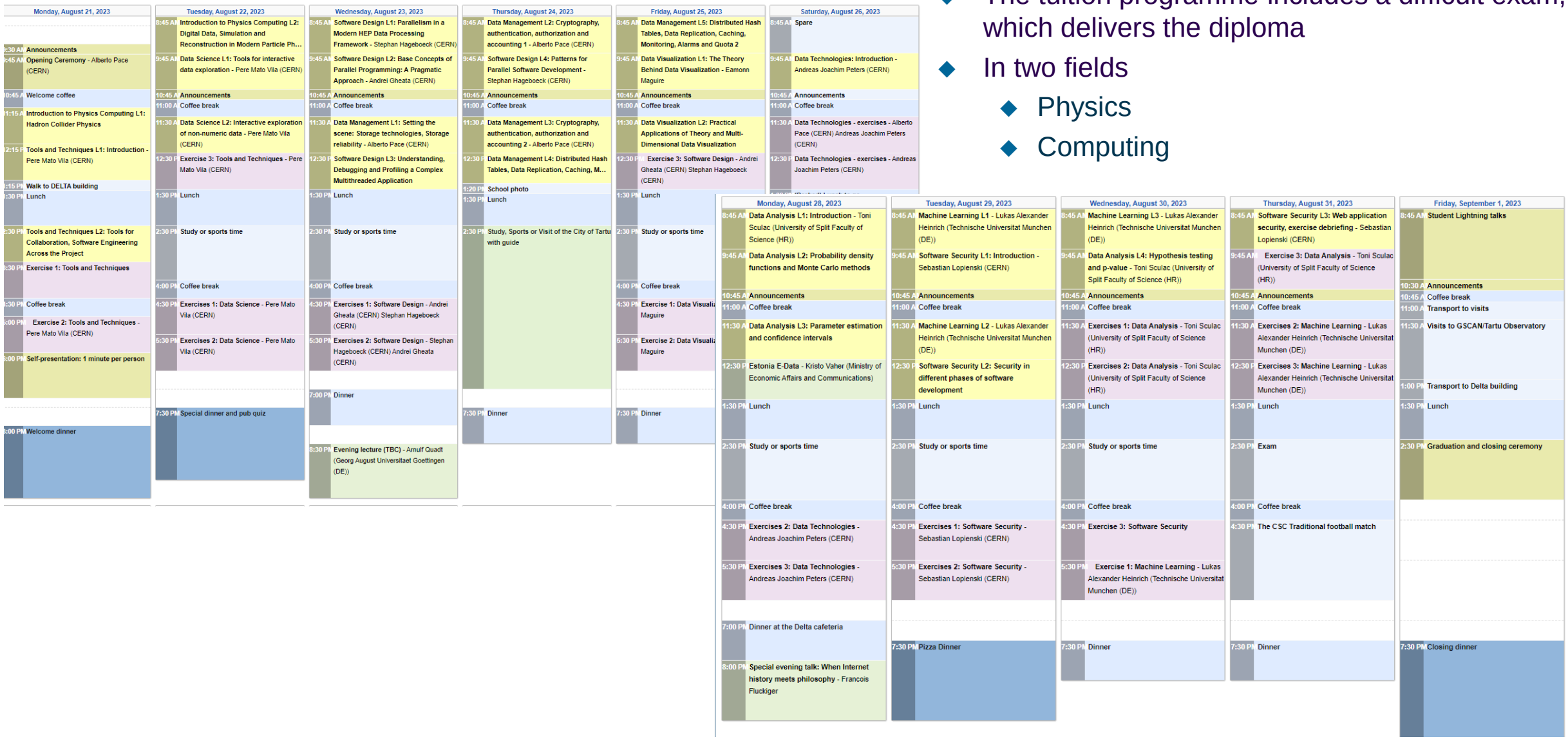
Total : 50 hours






The tuition programme



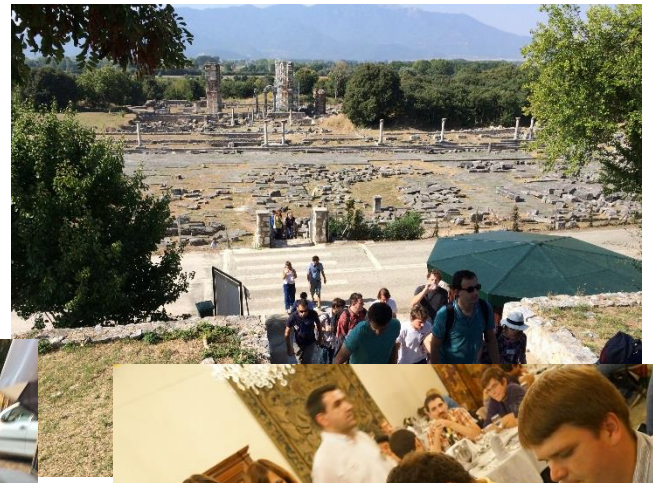
Monday, August 21, 2023	Tuesday, August 22, 2023	Wednesday, August 23, 2023	Thursday, August 24, 2023	Friday, August 25, 2023	Saturday, August 26, 2023
Announcements	Introduction to Physics Computing L2: Digital Data, Simulation and Reconstruction in Modern Particle Ph…	Software Design L1: Parallelism in a Modern HEP Data Processing Framework - Stephan Hageboeck (CERN)	Data Management L2: Cryptography, authentication, authorization and accounting 1 - Alberto Pace (CERN)	Data Management L5: Distributed Hash Tables, Data Replication, Caching, Monitoring, Alarms and Quota 2	Spare
Opening Ceremony - Alberto Pace (CERN)	Data Science L1: Tools for interactive data exploration - Pere Mato Vila (CERN)	Software Design L2: Base Concepts of Parallel Programming: A Pragmatic Approach - Andrei Gheata (CERN)	Software Design L4: Patterns for Parallel Software Development - Stephan Hageboeck (CERN)	Data Visualization L1: The Theory Behind Data Visualization - Eamonn Maguire	Data Technologies: Introduction - Andreas Joachim Peters (CERN)
Welcome coffee	Announcements	Announcements	Announcements	Announcements	Announcements
Introduction to Physics Computing L1: Hadron Collider Physics	Coffee break	Coffee break	Coffee break	Coffee break	Coffee break
Tools and Techniques L1: Introduction - Pere Mato Vila (CERN)	Data Science L2: Interactive exploration of non-numeric data - Pere Mato Vila (CERN)	Data Management L1: Setting the scene: Storage technologies, Storage reliability - Alberto Pace (CERN)	Data Management L3: Cryptography, authentication, authorization and accounting 2 - Alberto Pace (CERN)	Data Visualization L2: Practical Applications of Theory and Multi-Dimensional Data Visualization	Data Technologies - exercises - Alberto Pace (CERN) Andreas Joachim Peters (CERN)
Walk to DELTA building	Exercise 3: Tools and Techniques - Pere Mato Vila (CERN)	Software Design L3: Understanding, Debugging and Profiling a Complex Multithreaded Application	Data Management L4: Distributed Hash Tables, Data Replication, Caching, M…	Exercise 3: Software Design - Andrei Gheata (CERN) Stephan Hageboeck (CERN)	Data Technologies - exercises - Andreas Joachim Peters (CERN)
Lunch	Lunch	Lunch	School photo	Lunch	
Tools and Techniques L2: Tools for Collaboration, Software Engineering Across the Project	Study or sports time	Study or sports time	Lunch	Study or sports time	
Exercise 1: Tools and Techniques	Coffee break	Coffee break	Study, Sports or Visit of the City of Tartu with guide	Coffee break	
Coffee break	Exercises 1: Data Science - Pere Mato Vila (CERN)	Exercises 1: Software Design - Andrei Gheata (CERN) Stephan Hageboeck (CERN)		Exercise 1: Data Visualization Maguire	
Exercise 2: Tools and Techniques - Pere Mato Vila (CERN)	Exercises 2: Data Science - Pere Mato Vila (CERN)	Exercises 2: Software Design - Stephan Hageboeck (CERN) Andrei Gheata (CERN)		Exercise 2: Data Visualization Maguire	
Self-presentation: 1 minute per person		Dinner	Dinner	Dinner	
Welcome dinner	Special dinner and pub quiz	Evening lecture (TBC) - Arnulf Quadt (Georg August Universitaet Goettingen (DE))			

- The tuition programme includes a difficult exam, which delivers the diploma
- In two fields
  - Physics
  - Computing

Monday, August 28, 2023	Tuesday, August 29, 2023	Wednesday, August 30, 2023	Thursday, August 31, 2023	Friday, September 1, 2023
Data Analysis L1: Introduction - Toni Sculac (University of Split Faculty of Science (HR))	Machine Learning L1 - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))	Machine Learning L3 - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))	Software Security L3: Web application security, exercise debriefing - Sebastian Lopienski (CERN)	Student Lightning talks
Data Analysis L2: Probability density functions and Monte Carlo methods	Software Security L1: Introduction - Sebastian Lopienski (CERN)	Data Analysis L4: Hypothesis testing and p-value - Toni Sculac (University of Split Faculty of Science (HR))	Exercise 3: Data Analysis - Toni Sculac (University of Split Faculty of Science (HR))	Announcements
Announcements	Announcements	Announcements	Announcements	Coffee break
Coffee break	Coffee break	Coffee break	Coffee break	Transport to visits
Data Analysis L3: Parameter estimation and confidence intervals	Machine Learning L2 - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))	Exercises 1: Data Analysis - Toni Sculac (University of Split Faculty of Science (HR))	Exercises 2: Machine Learning - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))	Visits to GSCAN/Tartu Observatory
Estonia E-Data - Kristo Vaher (Ministry of Economic Affairs and Communications)	Software Security L2: Security in different phases of software development	Exercises 2: Data Analysis - Toni Sculac (University of Split Faculty of Science (HR))	Exercises 3: Machine Learning - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))	Transport to Delta building
Lunch	Lunch	Lunch	Lunch	Lunch
Study or sports time	Study or sports time	Study or sports time	Exam	Graduation and closing ceremony
Coffee break	Coffee break	Coffee break	Coffee break	
Exercises 2: Data Technologies - Andreas Joachim Peters (CERN)	Exercises 1: Software Security - Sebastian Lopienski (CERN)	Exercise 3: Software Security	The CSC Traditional football match	
Exercises 3: Data Technologies - Andreas Joachim Peters (CERN)	Exercises 2: Software Security - Sebastian Lopienski (CERN)	Exercise 1: Machine Learning - Lukas Alexander Heinrich (Technische Universitat Munchen (DE))		
Dinner at the Delta cafeteria	Pizza Dinner	Dinner	Dinner	Closing dinner
Special evening talk: When Internet history meets philosophy - Francois Fluckiger				

The school social programme

- Aiming at establishing lifetime links among participants
  - Lunches, dinners, games, excursions, culture, evening lectures, music, sports, …



What about the participants of the school ?

Who are you ?

The CSC 2023 participants

This year main school (2023)

- 135 applicants from 45 nationalities, from 82 institutes/universities
- Selected 69 students from 27 nationalities, 38 institutes
  - Austria, Belgium, Canada, China, Croatia, Ecuador, Estonia, Germany, Greece, India, Iran, Italy, Mexico, Netherlands, Pakistan, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Kingdom, United States
- 32 % female applications (43/135), 35 % female participants (24/69)

38 different Institutes, National Laboratories, Universities

- AGH University of Science and Technology (Poland), Albert Ludwigs University of Freiburg (Germany), CERN (Switzerland), Charles University (Czech Republic), ETH Zürich (Switzerland), Federal University of Rio Grande do Sul (Brazil), Helsinki Institute of Physics (Finland), HEPHY (Austria), INFN (Italy), University of Ferrara (Italy), University of Milan (Italy), Institute of Nuclear Physics PAN (Poland), ISIS Neutron and Muon Source (United Kingdom), Jan Kochanowski University (Poland), Jozef Stefan Institute (Slovenia), Karlsruhe Institute of Technology (Germany), KTH Royal Institute of Technology (Sweden), Lund University (Sweden), Paris-Saclay University CNRS (France), Polytechnic of Milan (Italy), Rheinische Friedrich-Wilhelms University Bonn (Germany), Science and Technology Facilities Council (United Kingdom), Technical University of Dortmund (Germany), Technical University of Munich (Germany), The Institute for Research in Fundamental Sciences (Iran), The Jozef Stefan Institute (Slovenia), The University of Bucharest (Romania), Tsinghua University (China), University of Bonn (Germany), University of Cape Town (South Africa), University of Hamburg (Germany), University of Heidelberg (Germany), University of Ljubljana (Slovenia), University of Rome Tor Vergata (Italy), University of Rome (La Sapienza (Italy), University of Tartu (Estonia), University of Victoria (Canada), Vienna University of Technology (Austria).


AGH
IPA
ETH zürich
INFN
Istituto Nazionale di Fisica Nucleare
LUND UNIVERSITY
UNIVERSITÄT FREIBURG
UHH
Universität Hamburg
université PARIS-SACLAY
POLITEHNICA
UNIVERSITATEA
DIN BUCUREŞTI
UPB
1818
CERN
KIT
Karlsruher Institut für Technologie
UNIVERSITY OF HELSINKI
University of Ljubljana
UKRI
Science and Technology Facilities Council
POLITECNICO
MILANO
TARTU ÜLIKOOL
UNIVERSITAS TARTUENSIS
1632
UFRGS
UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
Jožef Stefan Institute
TU WIEN
TECHNISCHE UNIVERSITÄT WIEN
UNI BONN
technische universität dortmund
Heidelberg
UNIVERSITY
TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA
ISIS
UVIC
SAPIENZA
UNIVERSITÀ DI ROMA
IPM
INSTITUTE FOR RESEARCH IN FUNDAMENTAL SCIENCES
HEPHY
INSTITUTE OF HIGH ENERGY PHYSICS
University of Cape Town
Technische Universität München

We have quite some diversity …

But where is the value?

Excerpts from reference letters

- … is an exceptionally good student with high self-motivation, outstanding learning skills and most enthusiastic attitude to research
- … was among the top performers in his class. … a diligent, highly intelligent, independent, and responsible student. … has shown a great interest in applying mathematics and computer science to the field of physics, and …
- … is an exceptional student with a strong background in high performance computing, hybrid architectures, and machine learning.
- … is an outstanding PhD student in all respects and has an impressive learning curve …
- … certainly belongs to the top 10% of PhD students I have seen so far in CMS
- Compared to other top researchers at his stage, I would rank … among the top 10% of collaborators I have worked with
- … completed … studies at the graduate programme of Particle physics at the Faculty of Mathematics and Physics with one of the highest scores.
- I would rank … overall performance to be in the top 5% of students I taught or supervised in the last 10 years.
- I would place … compared to other students at a similar stage in their career in top 5% (exceptional) .
- … is among the strongest students (5%) that I have worked with …
- I would place … among the top 2% …
- I would rank … in the top 2% of students that I have taught in the past decade
- … among the best 2% of the students
- Among the students of same age and experience I believe … is among the best 2%, with the right characteristics to continue
- … is an outstanding student. … is extremely bright and independent. … has an impressive record of achievements at such an early stage of his career

Who are the CSC participants ?

- You are young, diverse, come from many countries, from different institutes …
- You have all an outstanding potential and a passion for both computing and science.
- You will spend two weeks to widen your skills but also work together and establish lifetime links with other participants and research institutes across the world that will be useful throughout your future career.
- This is what gives the highest value to the school

It is a small world …

- Top scientists knows each other very well

CSC 2022, Krakow, Poland

CSC 2023, Tartu, Estonia

- Are you ready to write history ?


CERN

CERN School of Computing 2023

Tartu, Estonia