CERN School of Computing 2024

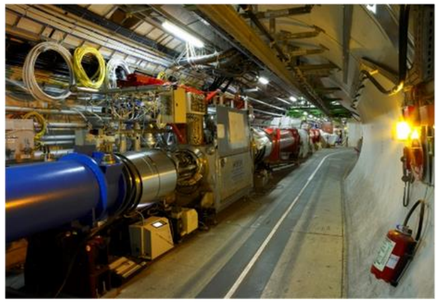
Alberto Pace, school director

DESY, Hamburg, Germany

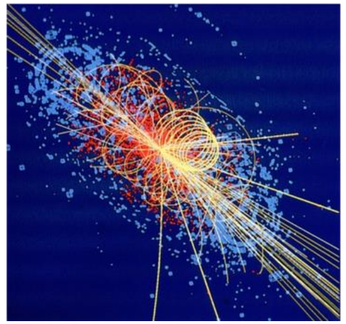
csc.web.cern.ch

CERN'S MISSION

THE CERN SCHOOL OF COMPUTING IS HERE



ACCELERATING BEAMS (ACCELERATORS)



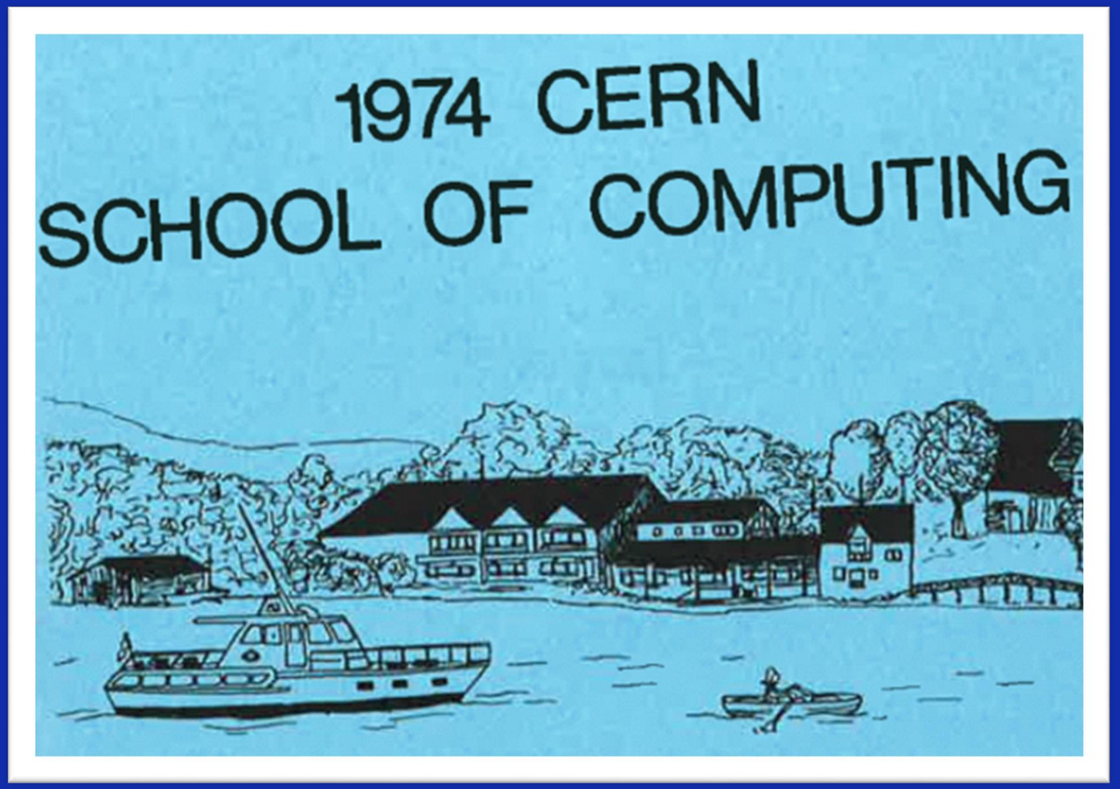
DETECTING PARTICLES (EXPERIMENTS)

LARGE-SCALE COMPUTING (ANALYSIS)

DISCOVERY

A SCHOOL WITH A LONG HISTORY

- CREATED IN 1970, 2024 IS THE 45TH EDITION
- HAS VISITED 23 COUNTRIES
- 3200+ STUDENTS HAVE FOLLOWED THE SCHOOL

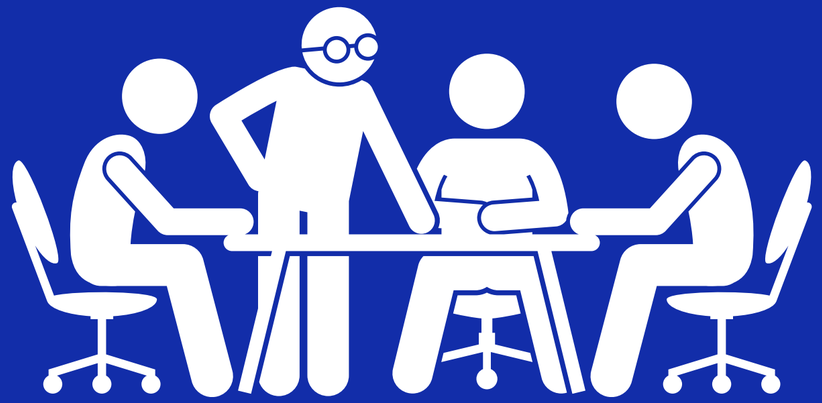


MANDATE & MISSION

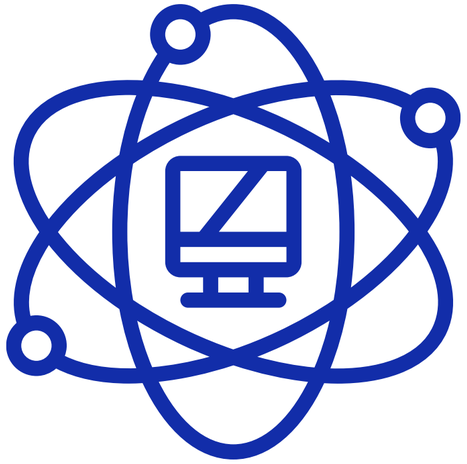
- Create a common culture in scientific computing among young scientists and engineers involved in particle physics or other sciences, as a strategic direction to promote mobility and to facilitate the development of large computing-oriented transnational projects.

- Participants come from worldwide laboratories and universities with typically 20 to 30 different nationalities
  - 60+ nationalities in the last 10 years

https://csc.web.cern.ch/history/alumni/



BRIDGING SCIENCE & 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

ADDITIONAL SIDE EFFECT:

- Knowledge transfer of (cern) skills and (cern) know-how in computing to academic, national laboratories, research institutes, institutional and industrial circles in member states and other countries
  - With direct or potential applications up to all spheres of the society (as exemplified with the web, and the grid).

AN OUTREACH OPPORTUNITY

FOR THE LOCAL ORGANISERS

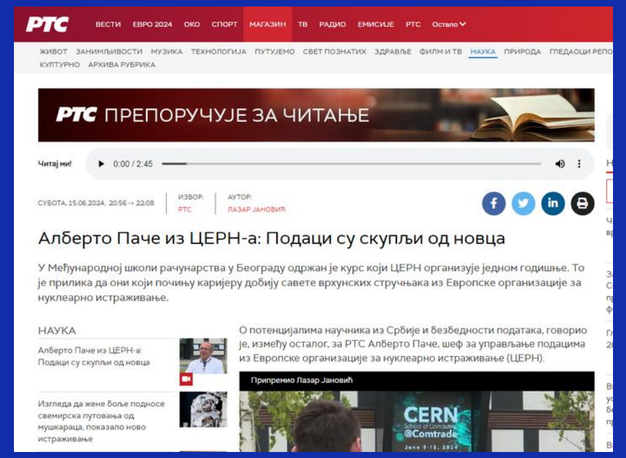
ΚΑΘΗΜΕΡΙΝΗ **ΚΑΒΑΛΑ**

ΚΑΘΗΜΕΡΙΝΗ ΕΦΗΜΕΡΙΔΑ ΤΗΣ ΚΑΒΑΛΑΣ

Χρόνος 41ος - Αριθμός Φύλλου 11087 Παρασκευή 11 Σεπτεμβρίου 2015 Τιμή φύλλου 0,50 EURO

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

Μεγάλη διοργάνωση, πολλαπλά τα κέρδη



AN OUTREACH OPPORTUNITY

FOR CERN

CERN@DESY public event

18 September 2024

DESY

Overview	Timetable	Speakers	Registration	Getting to DESY	Privacy policy

Have you ever heard of CERN and wondered what the researchers are working on? Or would you like to know more about career opportunities at one of the world's largest research centres?

Join us at the **CERN@DESY public event** on **18 September** to listen to expert presentations on what CERN is doing in general, the computing challenges CERN faces and what opportunities CERN offers for students and early stage professionals.

This public event is part of the CERN School of Computing 2024 which is hosted at DESY. After the presentations, you are cordially invited to stay for a networking reception to continue the discussion and meet the speakers and the students of the CERN School of Computing coming from 32 countries.

Please register for this event by 11 September 23:59.

This event will also be available via Zoom (link will be provided later), but physical presence is preferred.

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
  - At the end of each school, we invite students to propose some lectures, and we organise an ‘inverted’ school: ‘where students turn into teachers’
  - In 2024, the 15th edition had 14 lecturers and more than hundred participants

THE SCHOOL ACADEMIC DIMENSION

- THE SCHOOL
  - Is not a conference
  - Is not a place for lecturers to present their work, promote 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 ON NOTIONS AND KNOWHOW

THE SCHOOL GOVERNANCE

- IS DISCUSSED AT THE SCHOOL ADVISORY COMMITTEE
  - Composed of several full-time university professors, field experts and scientists
  - from different countries

THE SCHOOL ADVISORY COMMITTEE

Arnulf Quadt
Advisory Committee Chair, Programme Committee
Universität Göttingen

Andrzej Nowicki
School Technical Manager, Advisory Committee
CERN

Toni Šćulac
Advisory Committee
University of Split, Faculty of Science

Alberto Pace
School Director, Advisory Committee , Programme Committee
CERN

Sebastian Łopieński
Advisory Committee
CERN

Veronika Zadin
Advisory Committee
University of Tartu Institute of Technology

Enrica Porcari
Advisory Committee, CERN IT Department Head
CERN

Verena Kain
Advisory Committee, Programme Committee
CERN

Judith Katzy
CSC 2024 Local Organising Committee
Deutsches Elektronen-Synchrotron DESY

Kristina Gunne
School Administrative Manager, Advisory Committee
CERN

Danilo Piparo
Advisory Committee, Programme Committee
CERN

THIS YEAR'S SCHOOL

csc.web.cern.ch

ACADEMIC PROGRAMME

TOTAL: 50+ HOURS

PHYSICS COMPUTING

- PHYSICS COMPUTING
- DATA SCIENCE AND INTERACTIVE DATA EXPLORATION
- DATA ANALYSIS
- INTRODUCTION TO MACHINE LEARNING

SOFTWARE ENGINEERING

- TOOLS AND TECHNIQUES
- SOFTWARE DESIGN IN THE MANY-CORES ERA
- CREATING SECURE SOFTWARE
- SUSTAINABLE COMPUTING

DATA TECHNOLOGIES

- DATA MANAGEMENT
- DATA AND STORAGE TECHNOLOGIES



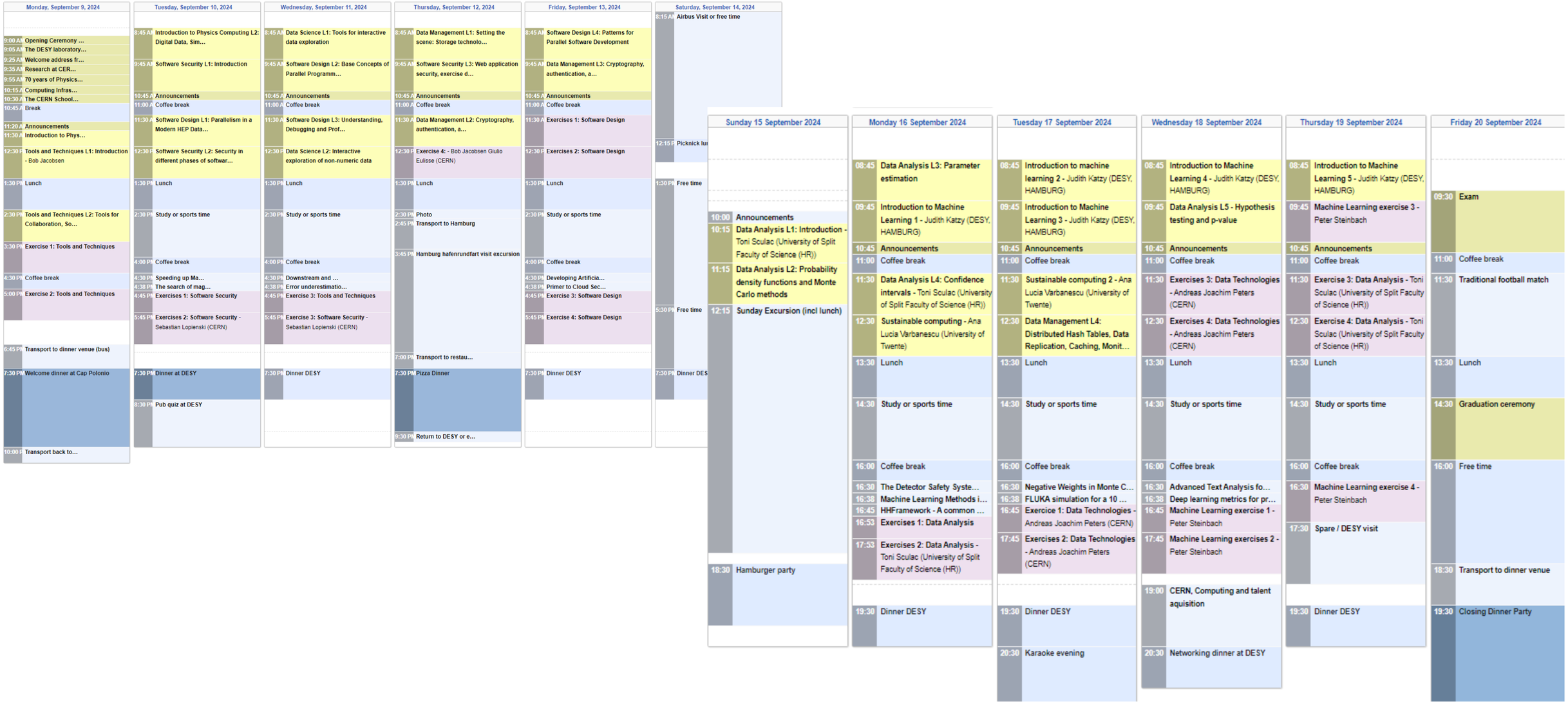









THE SCHOOL PROGRAMME



Monday, September 9, 2024

- 9:00 AM Opening Ceremony ...
- 9:05 AM The DESY laboratory...
- 9:25 AM Welcome address fr...
- 9:35 AM Research at CER...
- 9:55 AM 70 years of Physics...
- 10:15 AM Computing Infras...
- 10:30 AM The CERN School...
- 10:45 AM Break
- 11:20 AM Announcements
- 11:30 AM Introduction to Phys...
- 12:30 PM Tools and Techniques L1: Introduction - Bob Jacobsen
- 1:30 PM Lunch
- 2:30 PM Tools and Techniques L2: Tools for Collaboration, So...
- 3:30 PM Exercise 1: Tools and Techniques
- 4:30 PM Coffee break
- 5:00 PM Exercise 2: Tools and Techniques
- 6:45 PM Transport to dinner venue (bus)
- 7:30 PM Welcome dinner at Cap Polonio
- 10:00 PM Transport back to...

Tuesday, September 10, 2024

- 8:45 AM Introduction to Physics Computing L2: Digital Data, Sim...
- 9:45 AM Software Security L1: Introduction
- 10:45 AM Announcements
- 11:00 AM Coffee break
- 11:30 AM Software Design L1: Parallelism in a Modern HEP Data...
- 12:30 PM Software Security L2: Security in different phases of softwar...
- 1:30 PM Lunch
- 2:30 PM Study or sports time
- 4:00 PM Coffee break
- 4:30 PM Speeding up Ma...
- 4:38 PM The search of mag...
- 4:45 PM Exercises 1: Software Security
- 5:45 PM Exercises 2: Software Security - Sebastian Lopienski (CERN)
- 7:30 PM Dinner at DESY
- 8:30 PM Pub quiz at DESY

Wednesday, September 11, 2024

- 8:45 AM Data Science L1: Tools for interactive data exploration
- 9:45 AM Software Design L2: Base Concepts of Parallel Programm...
- 10:45 AM Announcements
- 11:00 AM Coffee break
- 11:30 AM Software Design L3: Understanding, Debugging and Prof...
- 12:30 PM Data Science L2: Interactive exploration of non-numeric data
- 1:30 PM Lunch
- 2:30 PM Study or sports time
- 4:00 PM Coffee break
- 4:30 PM Downstream and ...
- 4:38 PM Error underestimatio...
- 4:45 PM Exercise 3: Tools and Techniques
- 5:45 PM Exercise 3: Software Security - Sebastian Lopienski (CERN)
- 7:30 PM Dinner DESY

Thursday, September 12, 2024

- 8:45 AM Data Management L1: Setting the scene: Storage technolo...
- 9:45 AM Software Security L3: Web application security, exercise d...
- 10:45 AM Announcements
- 11:00 AM Coffee break
- 11:30 AM Data Management L2: Cryptography, authentication, a...
- 12:30 PM Exercise 4: - Bob Jacobsen Giulio Eulisse (CERN)
- 1:30 PM Lunch
- 2:30 PM Photo
- 2:45 PM Transport to Hamburg
- 3:45 PM Hamburg hafenrundfart visit excursion
- 7:00 PM Transport to restau...
- 7:30 PM Pizza Dinner
- 9:30 PM Return to DESY or e...

Friday, September 13, 2024

- 8:45 AM Software Design L4: Patterns for Parallel Software Development
- 9:45 AM Data Management L3: Cryptography, authentication, a...
- 10:45 AM Announcements
- 11:00 AM Coffee break
- 11:30 AM Exercises 1: Software Design
- 12:30 PM Exercises 2: Software Design
- 1:30 PM Lunch
- 2:30 PM Study or sports time
- 4:00 PM Coffee break
- 4:30 PM Developing Artificia...
- 4:38 PM Primer to Cloud Sec...
- 4:45 PM Exercise 3: Software Design
- 5:45 PM Exercise 4: Software Design
- 7:30 PM Dinner DESY

Saturday, September 14, 2024

- 8:15 AM Airbus Visit or free time
- 12:15 PM Picknick lu
- 1:30 PM Free time
- 5:30 PM Free time
- 7:30 PM Dinner DES

Sunday 15 September 2024

- 10:00 Announcements
- 10:15 Data Analysis L1: Introduction - Toni Sculac (University of Split Faculty of Science (HR))
- 11:15 Data Analysis L2: Probability density functions and Monte Carlo methods
- 12:15 Sunday Excursion (incl lunch)
- 18:30 Hamburger party

Monday 16 September 2024

- 08:45 Data Analysis L3: Parameter estimation
- 09:45 Introduction to Machine Learning 1 - Judith Katzy (DESY, HAMBURG)
- 10:45 Announcements
- 11:00 Coffee break
- 11:30 Data Analysis L4: Confidence intervals - Toni Sculac (University of Split Faculty of Science (HR))
- 12:30 Sustainable computing - Ana Lucia Varbanescu (University of Twente)
- 13:30 Lunch
- 14:30 Study or sports time
- 16:00 Coffee break
- 16:30 The Detector Safety Syste...
- 16:38 Machine Learning Methods i...
- 16:45 HHFramework - A common ...
- 16:53 Exercises 1: Data Analysis
- 17:53 Exercises 2: Data Analysis - Toni Sculac (University of Split Faculty of Science (HR))
- 19:30 Dinner DESY

Tuesday 17 September 2024

- 08:45 Introduction to machine learning 2 - Judith Katzy (DESY, HAMBURG)
- 09:45 Introduction to Machine Learning 3 - Judith Katzy (DESY, HAMBURG)
- 10:45 Announcements
- 11:00 Coffee break
- 11:30 Sustainable computing 2 - Ana Lucia Varbanescu (University of Twente)
- 12:30 Data Management L4: Distributed Hash Tables, Data Replication, Caching, Monit...
- 13:30 Lunch
- 14:30 Study or sports time
- 16:00 Coffee break
- 16:30 Negative Weights in Monte C...
- 16:38 FLUKA simulation for a 10 ...
- 16:45 Exercice 1: Data Technologies - Andreas Joachim Peters (CERN)
- 17:45 Exercises 2: Data Technologies - Andreas Joachim Peters (CERN)
- 19:30 Dinner DESY
- 20:30 Karaoke evening

Wednesday 18 September 2024

- 08:45 Introduction to Machine Learning 4 - Judith Katzy (DESY, HAMBURG)
- 09:45 Data Analysis L5 - Hypothesis testing and p-value
- 10:45 Announcements
- 11:00 Coffee break
- 11:30 Exercises 3: Data Technologies - Andreas Joachim Peters (CERN)
- 12:30 Exercises 4: Data Technologies - Andreas Joachim Peters (CERN)
- 13:30 Lunch
- 14:30 Study or sports time
- 16:00 Coffee break
- 16:30 Advanced Text Analysis fo...
- 16:38 Deep learning metrics for pr...
- 16:45 Machine Learning exercise 1 - Peter Steinbach
- 17:45 Machine Learning exercises 2 - Peter Steinbach
- 19:00 CERN, Computing and talent aquisition
- 20:30 Networking dinner at DESY

Thursday 19 September 2024

- 08:45 Introduction to Machine Learning 5 - Judith Katzy (DESY, HAMBURG)
- 09:45 Machine Learning exercise 3 - Peter Steinbach
- 10:45 Announcements
- 11:00 Coffee break
- 11:30 Exercise 3: Data Analysis - Toni Sculac (University of Split Faculty of Science (HR))
- 12:30 Exercise 4: Data Analysis - Toni Sculac (University of Split Faculty of Science (HR))
- 13:30 Lunch
- 14:30 Study or sports time
- 16:00 Coffee break
- 16:30 Machine Learning exercise 4 - Peter Steinbach
- 17:30 Spare / DESY visit
- 19:30 Dinner DESY

Friday 20 September 2024

- 09:30 Exam
- 11:00 Coffee break
- 11:30 Traditional football match
- 13:30 Lunch
- 14:30 Graduation ceremony
- 16:00 Free time
- 18:30 Transport to dinner venue
- 19:30 Closing Dinner Party

But …

Who are the CSC 2024 participants ?

THIS YEAR MAIN SCHOOL (2024)

- 91 APPLICANTS
- 65 SELECTED STUDENTS:
  - FROM 30 NATIONALITIES
    - Argentina, Austria, Belgium, Brazil, Colombia, Czechia, Denmark, Egypt, France, Germany, Greece, India, Italy, Latvia, Mexico, Netherlands, Pakistan, Poland, Romania, Russia, South Africa, South Korea, Spain, Sweden, Switzerland, Thailand, Türkiye, Ukraine, United Kingdom, United States
  - FROM 36 INSTITUTES/UNIVERSITIES
- STUDENT'S BACKGROUND:
  - 44 Physics – related
  - 17 Computer Science – related
  - 4 other
- 25% FEMALE PARTICIPANTS


DESY.


IPHC
Institut Pluridisciplinaire
Hubert CURIEN
STRASBOURG


UNIVERSIDAD
DE ANTIOQUIA
1803


UNIVERSITÀ
DEGLI STUDI
DI PADOVA


UNIVERSITY
OF WARSAW


Durham
University


UKRI
Science and
Technology
Facilities Council


LUND UNIVERSITY


TU
WIEN
TECHNISCHE
UNIVERSITÄT
WIEN


LMU
LUDWIG-
MAXIMILIANS-
UNIVERSITÄT
MÜNCHEN


University of Cape Town • iYunivesithi yaseKapa • Universiteit van Kaapstad
SPES BONA


COLUMBIA
UNIVERSITY


CHARLES
UNIVERSITY


University
of Glasgow


University of Colorado
Boulder


CAIRO UNIVERSITY


CAPA
Centro de Astropartículas y
Física de Altas Energías
Universidad Zaragoza


TARAS SHEVCHENKO
NATIONAL UNIVERSITY OF KYIV
1834


CERN


SCUOLA
NORMALE
SUPERIORE


SFU
SIMON FRASER
UNIVERSITY


eli
nuclear physics


EPFL
ETH zürich


UNIVERSITY
OF BRESCIA


University
of Victoria


UNIVERSITY
of York


UNI
FREIBURG


INFN
Istituto Nazionale di Fisica Nucleare


MAX-PLANCK-INSTITUT
FÜR PHYSIK


CBPF


CZECH
TECHNICAL
UNIVERSITY
IN
PRAGUE

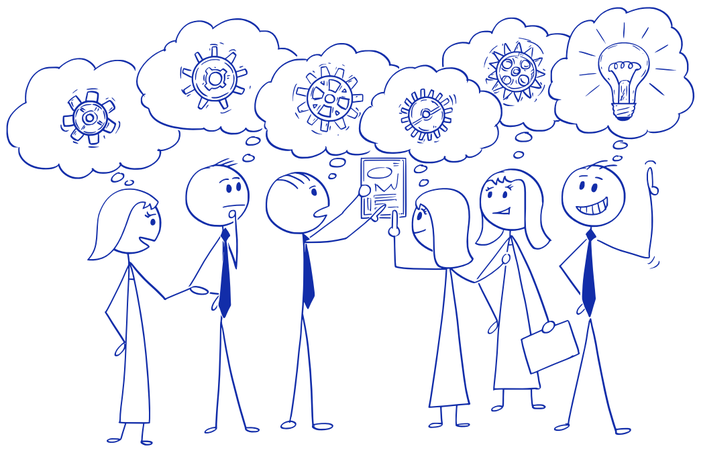

1862
RIGA TECHNICAL
UNIVERSITY


Med
Austron


JOHANN WOLFGANG GOETHE
UNIVERSITÄT
FRANKFURT AM MAIN


IFIC
INSTITUT DE FÍSICA
CORPUSCULAR

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

We have some diversity.

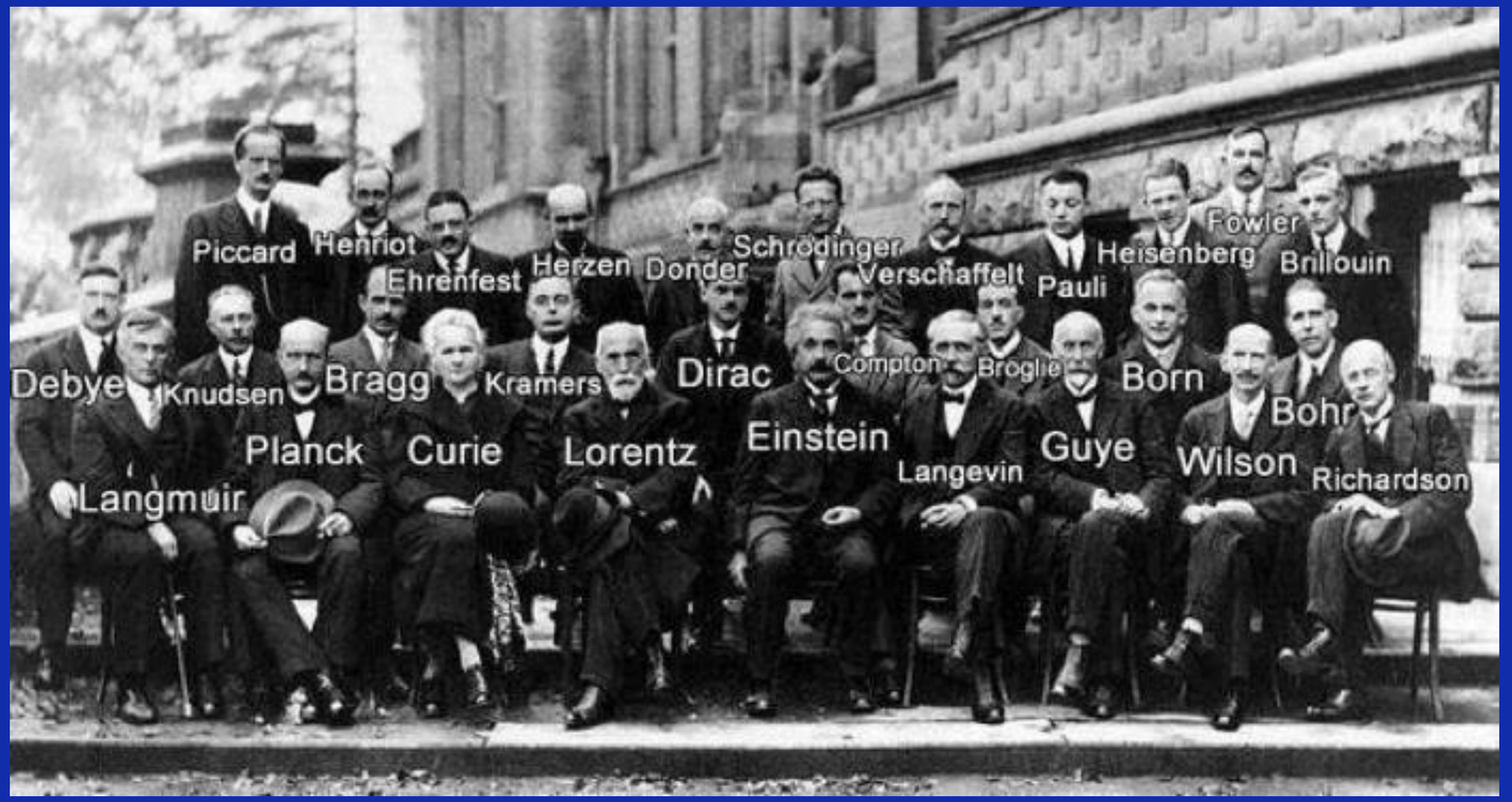
But, where is the value ?

EXCERPTS FROM REFERENCE LETTERS

- I can certify that XXX is an exceptionally good student with high self-motivation, outstanding learning skills and most enthusiastic attitude to research
- … is an excellent student with a very strong academic track record and promising research impact within the ATLAS collaboration
- … showed during the two years of the master's degree a lot of seriousness, the results she has obtained have always placed her among the best students of the master.
- … proved to be an excellent student in all aspects. … ranked second of the class, demonstrating an excellent attitude towards …
- I would rank him among the best 10% of PhD students I supervised so far
- is among the top 10% I ever worked with, and he was one of the top students in many aspects in his class
- Compared to other students in his peer group, I would rank XXX among the top 5%.
- Given his exceptional work, I would place XXX in the top 1% of her peers.

IT IS A SMALL WORLD...

- TOP SCIENTISTS KNOWS EACH OTHER VERY WELL



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CSC 2023 – Tartu, Estonia

CERN SCHOOL OF COMPUTING

IT IS A SMALL WORLD...

TOP SCIENTISTS KNOWS EACH OTHER VERY WELL

ARE YOU READY TO WRITE HISTORY?

SCHOOL PHOTO:
THURSDAY 12TH AT 14H30

CSC 2024 – Hamburg, Germany

THANK YOU!

csc.web.cern.ch

CERN SCHOOL OF COMPUTING
School briefing

csc.web.cern.ch

WHO AM I?
YOUR SCHOOL DIRECTOR!

ALBERTO PACE
ELECTRONIC ENGINEERING
(POLITECNICO DI MILANO)

Led many groups and various sections at CERN:

- General infrastructure (Mail, Web, Desktop)
- Storage
- Computing
- Education

Many years of experience in:

- Computing Services
- Software Engineering
- Accelerator Control
- Accelerator Operation

Teach at the University of Lausanne: ‘Programming’ course to master students and at the CSC on network protocols, grid and data technologies

OVERVIEW

INTRODUCTION	ORGANISING TEAM	SCHOOL SITE AND BOOKLET
SCHOOL RULES	LEARNING PROCESS	TUITION PROGRAMME
EXAM	LUNCHES & DINNERS	SOCIAL PROGRAMME
HISTORY	THIS YEAR	THANK YOU

ORGANISING TEAM

FROM CERN

ALBERTO PACE

ANDRZEJ NOWICKI

KRISTINA GUNNE

THE LOCAL ORGANISERS

JUDITH KATZY

KERSTIN BORRAS

THOMAS MADLENER

SABINE KROHN,
BIRGIT BREETZKE,
ANNA GERHARDT

LECTURERS

- Already here, available now !

BOB JACOBSEN

JUDITH KATZY

ANDREI GHEATA

ARNULF QUADT

GUILIO EULISSE

LECTURERS

Coming soon ...

ANA-LUCIA VARBANESCU

ANDREAS PETERS

PETER STEINBACH

SEBASTIAN LOPIENSKI

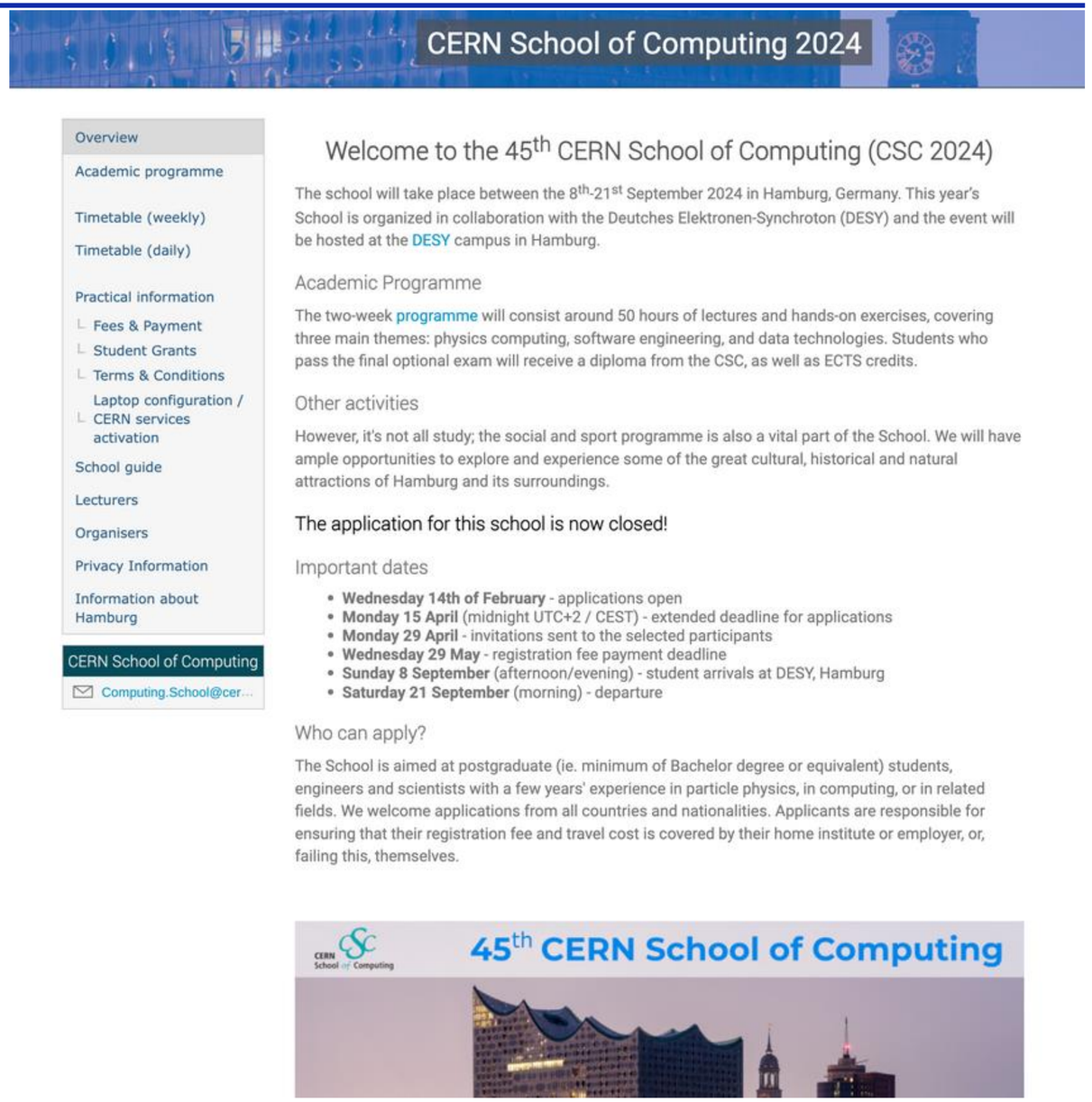
STEPHAN HAGEBOECK

TONI SCULAC

SCHOOL WEBSITE

https://indico.cern.ch/event/1376644/

CHECK IT REGULARLY FOR UPDATES!



SCHOOL BOOKLET IS AVAILABLE!

- Printed version for those who asked for it (we have extra ones)
- Electronic version (PDF) linked from school main page:
  https://indico.cern.ch/event/1376644/
- 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/J8y92nSgTfMD6Z6tg84v51

SCAN ME

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 RULES

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!

Spaceballs, Mel Brooks, 1987

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

SCHOOL RULES

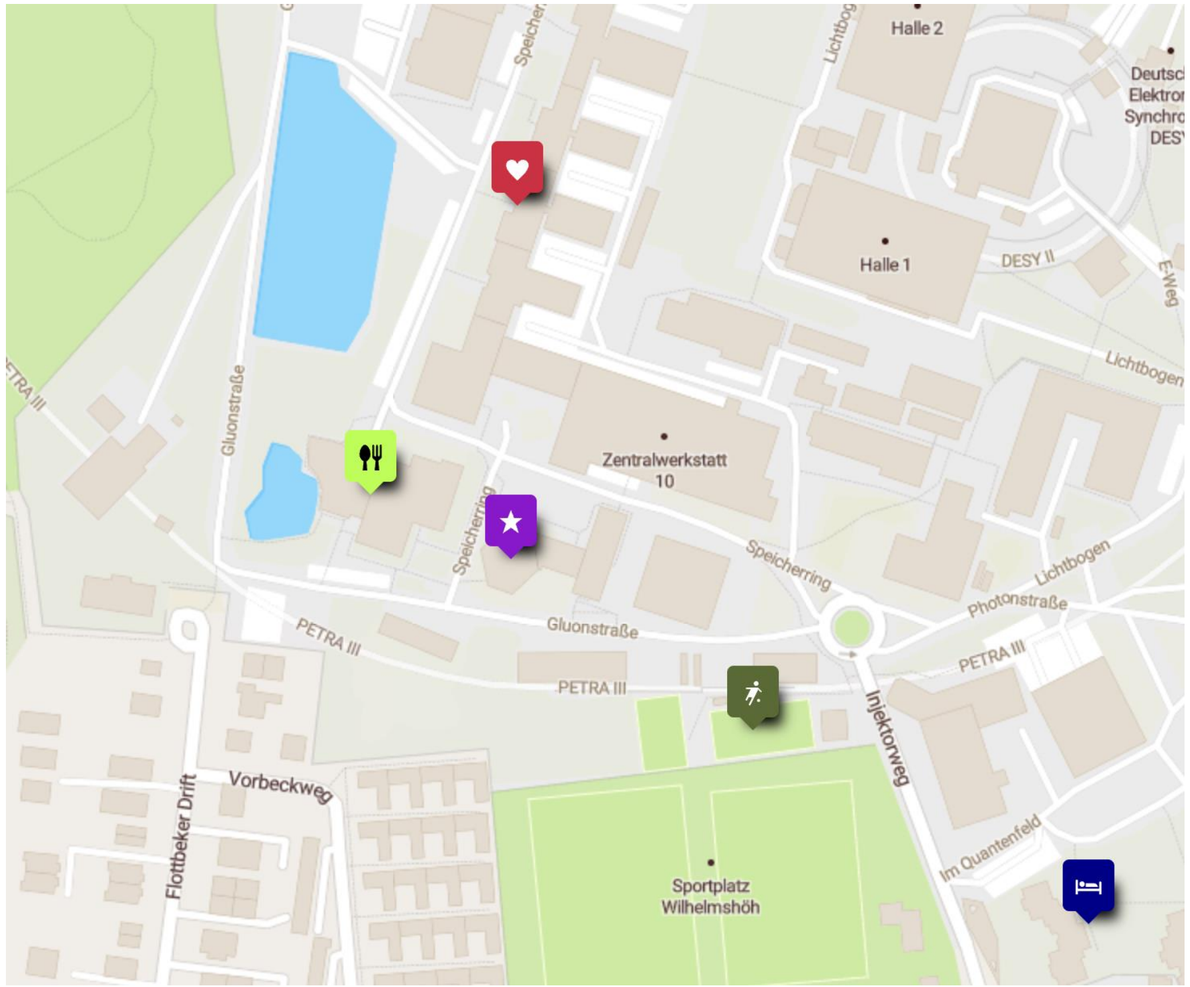
SCHOOL RULE #3

WEAR YOUR BADGE

- At least until I have learnt all your names!

THE SCHOOL LOCATION

THE SCHOOL LOCATION



http://u.osmfr.org/m/1111608/

CERN School of Computing

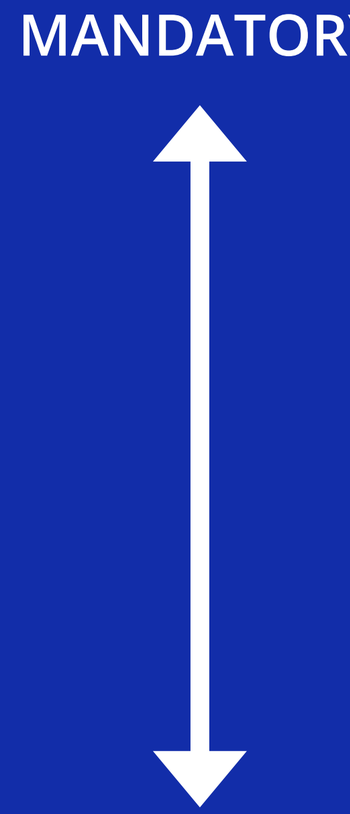
WI-FI

DESY.

- eduroam
- Science-Hotspot

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



THE SCHOOL LEARNING PROCESS

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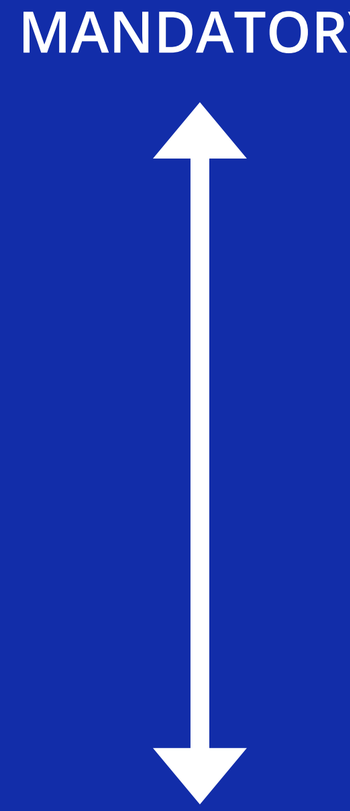

CERN School of Computing

THE SCHOOL PROGRAMME

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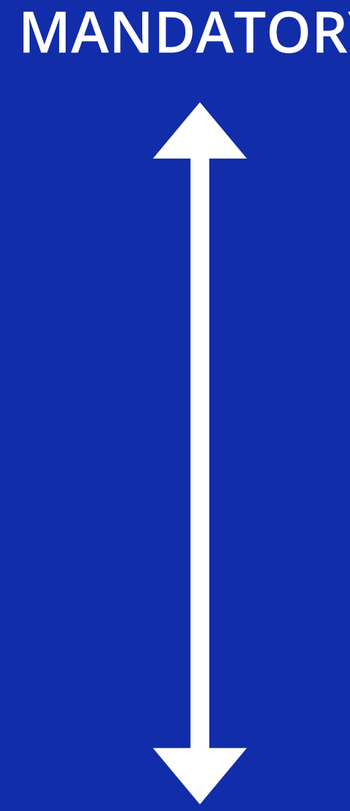
9:00 AM Opening Ceremony ...	8:45 AM Introduction to Physics Computing L2: Digital Data, Sim...	8:45 AM Data Science L1: Tools for interactive data exploration	8:45 AM Data Management L1: Setting the scene: Storage technolo...	8:45 AM Software Design L4: Patterns for Parallel Software Development	
9:05 AM The DESY laboratory...	9:45 AM Software Security L1: Introduction	9:45 AM Software Design L2: Base Concepts of Parallel Programm...	9:45 AM Software Security L3: Web application security, exercise d...	9:45 AM Data Management L3: Cryptography, authentication, a...	
9:25 AM Welcome address fr...	10:45 AM Announcements	10:45 AM Announcements	10:45 AM Announcements	10:45 AM Announcements	12:15 PM Picknick lunch
9:35 AM Research at CER...	11:00 AM Coffee break	11:00 AM Coffee break	11:00 AM Coffee break	11:00 AM Coffee break	
9:55 AM 70 years of Physics...	11:30 AM Software Design L1: Parallelism in a Modern HEP Data...	11:30 AM Software Design L3: Understanding, Debugging and Prof...	11:30 AM Data Management L2: Cryptography, authentication, a...	11:30 AM Exercises 1: Software Design	1:30 PM Free time
10:15 AM Computing Infras...	12:30 PM Software Security L2: Security in different phases of softwar...	12:30 PM Data Science L2: Interactive exploration of non-numeric data	12:30 PM Exercise 4: - Bob Jacobsen Giulio Eulisse (CERN)	12:30 PM Exercises 2: Software Design	
10:30 AM The CERN School...	1:30 PM Lunch	1:30 PM Lunch	1:30 PM Lunch	1:30 PM Lunch	
10:45 AM Break	2:30 PM Study or sports time	2:30 PM Study or sports time	2:30 PM Photo	2:30 PM Study or sports time	
11:20 AM Announcements	4:00 PM Coffee break	4:00 PM Coffee break	2:45 PM Transport to Hamburg	4:00 PM Coffee break	
11:30 AM Introduction to Phys...	4:30 PM Speeding up Ma...	4:30 PM Downstream and ...	3:45 PM Hamburg hafenrundfart visit excursion	4:30 PM Developing Artificia...	
12:30 PM Tools and Techniques L1: Introduction - Bob Jacobsen	4:38 PM The search of mag...	4:38 PM Error underestimatio...		4:38 PM Primer to Cloud Sec...	
1:30 PM Lunch	4:45 PM Exercises 1: Software Security	4:45 PM Exercise 3: Tools and Techniques		4:45 PM Exercise 3: Software Design	
2:30 PM Tools and Techniques L2: Tools for Collaboration, So...	5:45 PM Exercises 2: Software Security - Sebastian Lopienski (CERN)	5:45 PM Exercise 3: Software Security - Sebastian Lopienski (CERN)		5:45 PM Exercise 4: Software Design	
3:30 PM Exercise 1: Tools and Techniques			7:00 PM Transport to restau...		
4:30 PM Coffee break	7:30 PM Dinner at DESY	7:30 PM Dinner DESY	7:30 PM Pizza Dinner	7:30 PM Dinner DESY	7:30 PM Dinner DESY
5:00 PM Exercise 2: Tools and Techniques	8:30 PM Pub quiz at DESY		9:30 PM Return to DESY or e...		
6:45 PM Transport to dinner venue (bus)					
7:30 PM Welcome dinner at Cap Polonio					
10:00 PM Transport back to...					

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



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 PAIRS (2-STUDENT TEAMS). IF POSSIBLE:

1 student with physics background
1 student with computing background

THE SCHOOL LEARNING PROCESS

- LEARNING PROCESS
  - LECTURES
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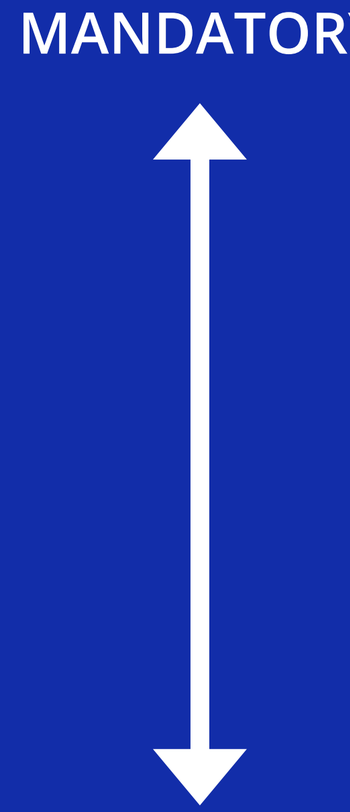

THE EXAM

FINAL EXAM, WHICH DELIVERS THE DIPLOMA

50% PASSING SCORE

EVALUATE KNOWLEDGE IN TWO FIELDS

PHYSICS & COMPUTING

SAMPLE QUESTION!

THE EXAM

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.

SAMPLE QUESTION!

THE EXAM

THE TEST STATISTIC IS USUALLY A SINGLE NUMBER WHOSE VALUE...

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THE EXAM

SAMPLE QUESTION!

IN THE PROCESS OF HYPOTHESES TESTING, WE OFTEN DEFINE THE NULL AND THE ALTERNATIVE HYPOTHESES. THE MOST ROBUST FINAL RESULTS ARE OBTAINED FOR …

- THE ACCEPTANCE OF THE ALTERNATIVE HYPOTHESIS.
- THE REJECTION OF THE DIFFERENCE BETWEEN NULL AND ALTERNATIVE HYPOTHESIS.
- THE ACCEPTANCE OF THE RATIO OF NULL AND ALTERNATIVE HYPOTHESIS.
- THE REJECTION OF THE NULL HYPOTHESIS.

THE EXAM

SAMPLE QUESTION!

IN THE PROCESS OF HYPOTHESES TESTING, WE OFTEN DEFINE THE NULL AND THE ALTERNATIVE HYPOTHESES. THE MOST ROBUST FINAL RESULTS ARE OBTAINED FOR …

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- THE REJECTION OF THE NULL HYPOTHESIS.

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

LUNCH & DINNERS

- MIX OF STUDENTS + LECTURERS

(OPTIONAL) SOCIAL PROGRAMME

- EXCURSIONS
  - CULTURE
  - HISTORY
  - NATURE
- SOCIAL GAMES

OPTIONAL SPORTS

OPTIONAL... BUT EXCEPTIONALLY POPULAR!

- 2/3 HOURS OF SPORT PROGRAMME PROPOSED EVERY AFTERNOON
- Provide a healthy work-life balance & provide additional opportunities for interactions between students, lecturers and organisers. Several of the lecturers act as sport instructors or organisers

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 STUDYING OR PRACTICING SPORTS
- ACROSS THE STREET FROM THE GUESTHOUSE

OTHER OPPORTUNITIES

- CITY BIKES

OTHER OPPORTUNITIES

- STUDYING

OTHER OPPORTUNITIES

- FARNIENTE

THANK YOU!

More info during the Daily Announcements

CERN School of Computing

CERN

DESY.

csc.web.cern.ch