



# CERN School of Computing (CSC)

[Joint WLCG-HSF workshop](#)  
26-29 March 2018, Naples

Sebastian Lopienski, CERN  
*CSC Director*

# CERN School of Computing

- The school was created in **1970**
- Visited 21 [countries](#)
  - recently: Spain, Belgium, Greece, Portugal, Cyprus, Sweden
  - **CSC 2018** (main school): October 1-14 in Tel Aviv, Israel
  - **Thematic CSC 2018**: June 3-9 in Split, Croatia
- 2600 students of ~80 different nationalities attended CSC
  - usually 60-80 per year
  - postgraduate engineers and scientists, often PhD students
- Organized by **CERN**, together with the hosting University
- Goal: **Create a common culture in scientific computing among young scientists and engineers involved in particle physics or other sciences**

# Academic dimension

## CSC is **not a conference**

- lecturers do not present their work or promote their projects



## CSC is **not a training session**

- not a replication of training courses commonly available at home institutes
- focus on persistent knowledge, less on know-how



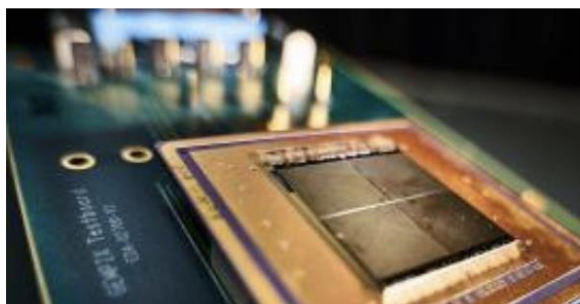
## CSC is **a summer university**

- programme audited by the hosting university
- final exam, diploma and ECTS points



# Three CSC schools per year

## iCSC 2018



### Inverted school

**5 Mar - 8 Mar 2018**

[CERN](#) | Geneva | Switzerland

[School Website](#)

[Schedule](#)

## tCSC 2018



### Thematic school

**3 Jun - 9 Jun 2018**

[MEDILS](#) | Split | Croatia

[School Website](#)

## CSC 2018



### Main school

**1 Oct - 14 Oct 2018**

[Tel Aviv University](#) | Tel Aviv | Israel

[School Website](#)

*Applications open - APPLY NOW!*

# Academic programme

- **Main School (CSC)** – 2 weeks, [broad spectrum of topics](#)
  - **Base Technologies** (architecture, SW design, security, networking)
  - **Physics Computing** (intro, tools+techniques, analysis, MV classif.)
  - **Data Technologies** (storage, data workflows, visualization)
- **Thematic CSC (tCSC)** – 1 week, **more advanced / focused**  
2018: [“High Throughput Distributed Processing of Future HEP Data”](#)
  - **Technologies+platforms** (efficient computing, data oriented design)
  - **Parallel and optimised scientific software development**
  - **Effective I/O for scientific applications** (data storage, preservation)
- **Inverted CSC (iCSC)** – 2-4 days, at CERN
  - various topics, as proposed by selected lecturers (CSC alumni)

# Tuition, social activities, logistics

*Main CSC: 2 weeks, every year in a different European country*

- Students lodged in a hotel or student residence, twin rooms
- Teaching at the University campus, or in the hotel
- ~55 hours of **lectures and hands-on exercises**
  - a **printed booklet** with lecture handouts is offered to each student
  - **exercises** in pairs, on students' laptops (VM, Jupyter notebooks etc.)
- Rich **social and sport programme**:
  - special dinners, scientific and cultural visits, pub quiz, evening talks, sport afternoon, full-day excursion
  - hidden goal: facilitate (human) networking

# Academic activities (CSC 2017)



Exercises



Scientific visits



Exam




Opening ceremony

# Social and sport activities (CSC 2017)





# CSC 2017 participants

 Applications **110**



**64 students invited**

- 37 different institutes (universities, labs etc.)
- 26 different nationalities
- 16 female students (25%)

# Student feedback: very positive

- *The school was awesome! Both in terms of academic growth and interpersonal development. It was great to meet people from different backgrounds and to work and socialise together. The quality of the organisation was especially good and I was very impressed by the enthusiasm and dedication of the lecturers. Overall, I would highly recommend the school [...] Thank you!*
- *Extremely valuable 2 weeks, thank you all for organising it so well!*
- *I'd like to thank all of you for organising a fantastic school! I had an amazing time, made a lot of friends, and learned more than I'd imagined possible. The university, city and country were also very welcoming to us. All in all this has been an experience I'll take with me the rest of my life. THANK YOU!!!*
- *With only small details where it can improve I consider this school to be (almost) perfect!*
- *Best school I have ever been to! Thank you [...] for all of your hard work!*
- *Excellent! Already told friends, colleagues, to apply for the next school!*
- **Can I repeat?**

# CSC 2018: applications are open - APPLY!

<https://indico.cern.ch/e/CSC-2018>



**CERN**  
**School of Computing**

Organised in collaboration with Tel Aviv University (TAU)

**1-14**  
**October 2018**  
**Tel Aviv,**  
**Israel**



**Deadline for Application : 6 May 2018**  
**<http://cern.ch/csc>**

# Challenges

- **Embrace heterogeneous audience**
  - CSC students: a mix of physicists and computer engineers
- **Not diverge into pure training**
  - i.e. teaching a particular technology
- **Keep the programme adapted to community needs**
  - without jumping on the hype wave
- **Maintain high quality of teaching**
  - by experts and university professors
- **Promote more diversity**
  - among both students and lecturers

**Thank you**



# CSC 2017 (Madrid, Spain)



CSC 2017

FAN CLUB

WPA-2 Entezp

Protected EAP

/ MSCHAPv2

setname: CSC

password: cern





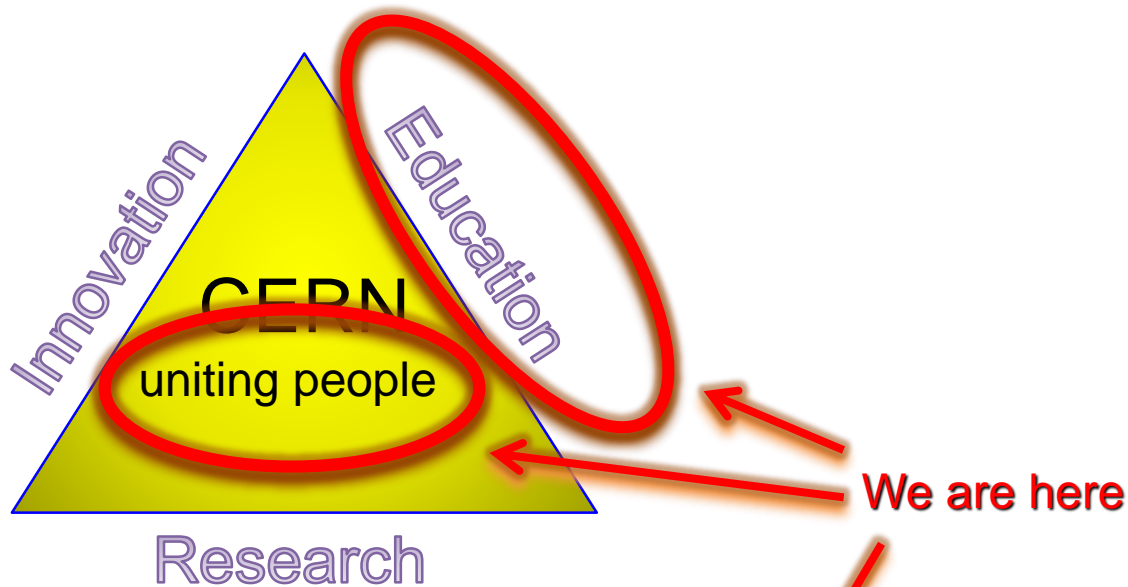
# CERN's three main schools

CERN Accelerator School (CAS)

CERN School of Physics

CERN School of Computing (CSC) ← We are here

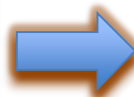
# CERN's mission



Accelerating beams  
(accelerators)



Detecting particles  
(experiments)



Large-scale  
computing  
(analysis)



Discovery

# Bridging science and computing

- Technological evolution in computing empowers science
  - especially in data-intensive domains such as High Energy Physics
  - **computing is the main strategy** for many scientific fields to do research efficiently on a large scale
- It is nowadays essential that:
  - **scientists master computing technologies** as a main tool for their research
  - **computer engineers understand the scientific needs** in order to deliver computing services to research projects

# A school with a long history

- The school was created in **1970**
- 40<sup>th</sup> edition in 2017
- **2600** students of ~80 different nationalities have followed the school
  - usually 60-80 per year
  - alumni web site: <http://cern.ch/CSC/alumni>
- The school has visited 21 countries
  - <http://cern.ch/CSC/past-schools>
  - recent: Spain, Belgium, Greece, Portugal, Cyprus, Sweden



# CERN School of Computing

- A summer school: **two weeks in August/September**
- Every year in a different European location
  - co-organized together with a local university
- 50+ hours of academic programme
  - **lectures + hands-on exercises** (students working in pairs)
  - Physics computing; Data management; Base technologies
- Exam, diploma and ECTS points
- Optional social and sport activities

# Scientific programme

- Prepared by the CSC Programme Committee
  - <http://cern.ch/csc/advisory-committee>
  - incl. 6 full-time university professors from various countries
- Covers the following topics:
  - **Physics Computing**
  - **Data Storage and Management**
  - **Base Technologies** (software, security, networking etc.)
- Audited every year by the hosting University
- Final examination
  - the University delivers **ECTS points** for successful students

# Students

- Usually 50-80 students every year
  - more applicants than places => a selection process
- Come from CERN (~50%) and elsewhere:
  - from other laboratories and universities, worldwide
- Postgraduate scientists and engineers involved in particle physics or other sciences, e.g.:
  - a Ph.D. student in particle physics, involved with an experiment
  - a computer engineer with M.Sc. degree (or completing it), working in a physics laboratory or institute

# Social activities

- The social and personal networking components are essential
  - Lunches, dinners, breaks, excursions
  - *(Optional)* Sports programme



Sebastian Lopiński – CERN School of Computing

