

**Stream Winter School**

**Report of Contributions**

Contribution ID: 1

Type: **not specified**

## Introduction

*Monday, 6 November 2017 09:00 (10 minutes)*

Heinz Pernegger (CERN)

Contribution ID: 2

Type: **not specified**

## Introduction

*Tuesday, 7 November 2017 09:00 (5 minutes)*

M. Capeans (CERN)

Contribution ID: 3

Type: **not specified**

## Lunch

*Tuesday, 7 November 2017 13:00 (1 hour)*

Contribution ID: 4

Type: **not specified**

## Marie Curie Day at CERN

*Tuesday, 7 November 2017 14:00 (4 hours)*

VENUE: Mezzanine out of the Council Chamber

13h30- 15h Posters session for the ESRs

15.00 –16.00 –Interviews and video life stream

16.00 –Talk by Dr. Marco Silari

Contribution ID: 5

Type: **not specified**

## Convincing in Scientific Presentation

*Wednesday, 8 November 2017 09:00 (8 hours)*

J. Clarke and S. Allegretti

Over 2.5 days, the ESRs will have the opportunity to enhance their presentation and communications skills, as well as the way they approach work-related collaborations. This course is designed specifically with a scientific researcher in mind.

During days 1 and 2, we cover all aspects of verbal scientific communication, asking participants to work as a work package team to present their research in a conference format prompting feedback on style and content. In addition The ESRs will learn what it takes to effectively collaborate with virtual colleagues, how to give and receive feedback and how to select from the various tools available for virtual presentations. We will guide the ESR on how to overcome common presentation challenges (such as nervousness and voice control), as well as those unique to scientists presenting the results of their research.

Contribution ID: 6

Type: **not specified**

## Convincing in Scientific Presentation - Day 2

*Thursday, 9 November 2017 09:00 (4 hours)*

From 12h we will move to room 112-R-028

J. Clarke and S. Allegretti

At the end of Day 2, the ESRs work package team will deliver a 20-minute scientific presentation with slides. You will receive feedback from the instructors and from a CERN technical expert to highlight positive aspects of delivery style and talk content, as well as to identify areas that require improvement.

Contribution ID: 7

Type: **not specified**

## Personal Branding and Marketing Yourself

*Friday, 10 November 2017 09:00 (4 hours)*

J. Clarke, N. Wilkins and S. Allegretti

During Day 3, we will switch gears and provide the ESRs with a template to present themselves during professional and networking situations. ESRs will draft and practice the “elevator pitch” and learn how to promote their work and research using social media.

Contribution ID: 8

Type: **not specified**

## Lunch

*Friday, 10 November 2017 13:00 (1 hour)*

Contribution ID: 9

Type: **not specified**

## Social media and talking to journalists

*Friday, 10 November 2017 14:00 (1h 15m)*

Clara Nellist

Social media has become a key source of information for many people. Scientists must adopt these online communication methods to ensure their research is discussed and shared in way that is open to all. We will look at various social media platforms and also how to deal with the media.

Contribution ID: **10**

Type: **not specified**

## **Interactive Approaches for Science Communication at the CERN MediaLab**

*Friday, 10 November 2017 15:35 (2 hours)*

Speaker: J.A. Pequeno (CERN)

The CERN Media Lab team conceives and implements interactive installations which have been featured in venues all over the planet and is helping several Science Centres conceive their new exhibits.

In this presentation we will have a peek into the principles, the technology developed, the projects, the context and scope, and hint about what will come in the future.

Contribution ID: 11

Type: **not specified**

## ATLAS Upgrade Week

*Monday, 13 November 2017 09:00 (8 hours)*

Program on: <https://indico.cern.ch/event/558935/>

Contribution ID: 12

Type: **not specified**

## ATLAS Upgrade Week

*Tuesday, 14 November 2017 09:00 (8 hours)*

Program on: <https://indico.cern.ch/event/558935/>

Contribution ID: 13

Type: **not specified**

## **ATLAS Upgrade Week**

*Wednesday, 15 November 2017 09:00 (8 hours)*

Program on: <https://indico.cern.ch/event/558935/>

Contribution ID: 14

Type: **not specified**

## ATLAS Upgrade Week

*Thursday, 16 November 2017 09:00 (8 hours)*

Program on: <https://indico.cern.ch/event/558935/>

Contribution ID: 15

Type: **not specified**

## ATLAS Upgrade Week

*Friday, 17 November 2017 09:00 (8 hours)*

Program on: <https://indico.cern.ch/event/558935/>

Contribution ID: 16

Type: **not specified**

## **Workshop "Being in the high performance zone"**

*Monday, 20 November 2017 09:00 (8 hours)*

Venue: WU Vienna

Room: EA.5.034

Trainers: Ursula Schweiger and Barbara Riedenbauer.

Topics: self-management, stress coping strategies and resilience

Contribution ID: 17

Type: **not specified**

## Workshop on "design thinking"

*Tuesday, 21 November 2017 09:00 (8 hours)*

Venue: WU Vienna  
Room EA.5.044 from 9h - 13h ,  
Room TC.4.15 from 13h- 17h

Trainer: Julia Bauer from Fraunhofer Ventures

Contribution ID: **18**

Type: **not specified**

## **Workshop on KT real-life project / Training activities**

*Wednesday, 22 November 2017 09:00 (8 hours)*

Venue: WU Vienna  
Room D2.0.330

Workshop on KT real-life projects (within a New Business Development Course)

ESRs of WP3 will meet the WU Vienna student and work on the real-life KT projects that are conducted in collaboration with CIS and ThermoFisher.

Contribution ID: 19

Type: **not specified**

## Silicon is for Physics what carbon is for life

*Monday, 6 November 2017 09:10 (1 hour)*

Speaker: E. Heijne (CERN)

Introduction: technological developments have become the basis for progress in the understanding of the world around us, more effectively than the ancient philosophical approach. From the Galilei telescope and the microscopes of Antony van Leeuwenhoek onwards, the inventions of scientific instruments led to discoveries in electricity, magnetism, light, cryogenic behaviour and numerous other phenomena. In return, this led to practical applications and further technological innovation. This technology/science spiral continues to open new ways to achieve ever deeper understanding of elementary particles. The subject of the lecture is the exploitation in physics of the micro-, nano- and pico-technologies based on silicon that are being developed for electronics and mechatronics. In the evolution of life, the element carbon has been preferred for a much broader range of structures, but progressively a wide variety of devices is now being created thanks to the amazing properties of the element silicon. A few other applications in science will be mentioned, such as chips with nanopores for DNA sequencing or CCD for astronomy. In future particle physics experiments, the silicon detectors could feature micron-size voxels using nanometer readout circuits. Such detectors will have improved precision in position and time measurement, and they can also record energy depositions well below a keV.

Contribution ID: **20**

Type: **not specified**

## Coffee break

*Monday, 6 November 2017 10:10 (20 minutes)*

Contribution ID: 21

Type: **not specified**

## Accelerators for the future

*Monday, 6 November 2017 10:30 (1 hour)*

Speaker: Dr JM Jimenez (CERN)

After a quick introduction of the technological challenges of the high-energy frontiers, an overview of the High Energy Physics (HEP) plans as discussed in the last update of the Europeans Strategy on Particle Physics is given in the frame of the Worldwide strategy. CERN response is detailed by going through the road map with its three main scientific pillars: full exploitation of the LHC, scientific diversity programme and preparation of CERN future.

Each of the three individual pillars is illustrated with detailed examples covering all technological domains and highlighting the priority given to breakthrough technologies.

Contribution ID: 22

Type: **not specified**

## Experiments for Future Circular Colliders

*Monday, 6 November 2017 11:30 (1 hour)*

Speaker: M. Aleksa (CERN)

**Abstract:** The feasibility of a new proton collider, the FCC-hh, with centre of mass energies of up to 100TeV and unprecedented luminosity is currently being studied. Such a machine will provide a discovery potential for new physics far beyond HL-LHC and will also allow precision measurements of rare physics channels that are not accessible with the HL-LHC. Possible experiments, allowing to exploit the full FCC-hh physics potential are under study at the moment. The talk will describe the requirements for such an FCC-hh experiment, the overall concepts that led its design and introduce possible detector technologies.

Contribution ID: 23

Type: **not specified**

## Lunch

*Monday, 6 November 2017 12:30 (1h 30m)*

Contribution ID: 24

Type: **not specified**

## Radiation Damage in Silicon Detectors

*Monday, 6 November 2017 14:00 (1 hour)*

Speaker: M. Mikuz (Univ. Ljubljana & J.Stefan Inst.)

Abstract: Radiation damage in silicon detectors used in high energy physics experiments is reviewed. Starting from basic silicon properties, effects of irradiation in hadron collider experiments are presented. Particle fields in detectors are examined in terms of ionization dose (TID) and especially non-ionizing energy loss (NIEL) responsible for displacement damage. A historical overview of silicon detector capabilities to cope with ever increasing radiation levels is given, with the paramount role of the CERN RD 48 and RD50 collaborations.

Contribution ID: 25

Type: **not specified**

## Flip chip interconnects in pixel detectors

*Monday, 6 November 2017 15:00 (1 hour)*

Speaker: S. Vahanen (ADVACAM)

Abstract: This presentation gives an overview on the flip chip process of hybrid pixel detectors. The focus is set on describing the different solder bumps structures used for various detector modules. The methods of depositing under-bump metallisation and solder / polymer adhesive bumps on the wafers will be described. Moreover, different solutions are suggested for Si and compound semiconductor modules bringing also the cost related factors on the table.

In flip chip part of the presentation, different flip chip (mainstream) techniques will be introduced from die to wafer-level. There are technological challenges in flip chip bonding of thin ASICs as they bow as a function of the temperature. There are several strategies in flip chip bonding of thin pixel modules, and some of these will be introduced.

Contribution ID: 26

Type: **not specified**

## Coffee break

*Monday, 6 November 2017 16:00 (30 minutes)*

Contribution ID: 27

Type: **not specified**

## **Panel Discussion: Challenges for future trackers**

*Monday, 6 November 2017 16:30 (1 hour)*

Chaired by Petra Riedler

Contribution ID: 28

Type: **not specified**

## Epitaxial wafer trends in industry

*Tuesday, 7 November 2017 09:05 (1 hour)*

Speaker: P. Collareta (GW-SEMI)

Silicon CVD epitaxy has been used in the semiconductor industry since the early 60's and continues to be one of the most important techniques for advanced microelectronics. The aim of this presentation is to review the process and the reactors used to deposit silicon epitaxial layers, to present the typical crystallographic defects of these layers and their influence on the device performance and to review the requirement of the CMOS Image sensors, one the most growing application. A short overview of the silicon wafers and epitaxial wafers market is then presented.

Contribution ID: 29

Type: **not specified**

## Future trends in sensor design

*Tuesday, 7 November 2017 10:05 (45 minutes)*

Speaker: T. Kugathasan (CERN)

This presentation gives an overview of the Monolithic pixels sensors for High Energy Physics applications and possible developments for future detectors.

- Introduction to the sensor principle and radiation tolerance
- State of the art ALPIDE pixel sensor chip for the ALICE ITS Upgrade
- Design for the ATLAS ITk outer layer, full scale prototypes and module concept

Contribution ID: **30**

Type: **not specified**

## Coffee break

*Tuesday, 7 November 2017 10:50 (20 minutes)*

Contribution ID: 31

Type: **not specified**

## **High-energy electrons detection in transmission electron microscopy**

*Tuesday, 7 November 2017 11:10 (55 minutes)*

Speaker: L. Mele (Thermo-Fisher)

Silicon-based pixelated detectors are gaining more and more popularity in electron microscopy and their development is boosting the fast growth of this market. Here an introduction to the basic interaction mechanisms of electrons in the energy range 80-300 keV with silicon-based pixelated detectors is given along with a description of the main acquisition techniques in transmission electron microscopy.

Contribution ID: 32

Type: **not specified**

## Preparing successful EU proposals

*Tuesday, 7 November 2017 12:05 (1 hour)*

Speaker: P. Tello (CERN)

The presentation will explain what are the most important elements that anyone interested in European funding should take into account for submitting a high quality project proposal.

Contribution ID: **33**

Type: **not specified**

## Coffee break

*Friday, 10 November 2017 15:15 (20 minutes)*