

2nd Summer School on INtelligent signal processing for FrontIER Research and Industry



Report of Contributions

Contribution ID: 0

Type: **not specified**

Registration

Monday, 14 July 2014 17:00 (3 hours)

The registration will be opened from 5 to 8pm.

Contribution ID: 1

Type: **not specified**

Welcome Introduction

Contribution ID: 2

Type: **not specified**

Introduction to the Paris-Diderot University, UnivESarth LabEx and APC Lab: Present and future Educational and Research Objectives

Tuesday, 15 July 2014 09:15 (30 minutes)

Campus in the City: Pierre Binetruy, former Director of the APC Laboratory and instrumental to its creation and development over these last 10 years, is currently co-director of the UnivEarthS LabEx and coordinator of the french participation in the LISA gravitational waves project.

Presenter: Prof. BINETRUY, Pierre (APC-University Paris-Diderot)

Contribution ID: 3

Type: **not specified**

About a few challenges for signal processing in emission and transmission tomography

Tuesday, 15 July 2014 09:45 (1h 15m)

Presenter: Prof. MOREL, Christian (University of Aix-Marseille/ imXGam-CPPM/CNRS (FR))

Contribution ID: 4

Type: **not specified**

New Challenges for Signal Processing for High Energy Physics experiments

Tuesday, 15 July 2014 11:30 (1h 30m)

Presenter: Prof. HALL, Geoffrey (Imperial College Sci., Tech. & Med. (GB))

Contribution ID: 5

Type: **not specified**

Labs session

Contribution ID: 6

Type: **not specified**

Overview Lecture 1

Contribution ID: 7

Type: **not specified**

Introduction to Very Deep Sub Micron CMOS technologies: the 65nm CMOS process for mixed mode analog-digital circuits

Wednesday, 16 July 2014 09:00 (1 hour)

Presentation type

Lecture

Summary

Future upgrades of detector systems for high energy physics experiments at high-luminosity colliders and for photon science at advanced X-ray sources set unprecedented and extremely challenging requirements to the readout electronics. In the case of pixel detectors, current designs of front-end microelectronic systems foresee the integration of very complex analog and digital functions inside small readout cells, and have to ensure the capability of handling huge data rates and of keeping adequate performance at extremely high radiation levels. The progress of industrial microelectronic technologies has to be exploited to the purpose of complying with these aggressive designs ideas for front-end integrated circuits at future experiments. Recently, the community of microelectronic designers has focused its activity on the 65 nm CMOS generation as a promising technology for these applications. This lecture provides a review of the potential advantages and challenges associated to the design of low noise, high speed and rad-hard mixed-signal circuits in such a process for pixel detectors in the fields of high energy physics and photon science.

Presenter: Prof. RE, Valerio (INFN and University of Bergamo (IT))

Session Classification: Second Morning Session

Contribution ID: 8

Type: **not specified**

Introduction to Very Deep SubMicron CMOS Technologies: FD-SOI technology for digital systems

Wednesday, 16 July 2014 10:00 (1 hour)

Presentation type

Lecture

Presenter: Dr FENOUILLET-BERANGER, Claire (CEA-LETI (FR))

Session Classification: Second Morning Session

Contribution ID: 9

Type: **not specified**

3D and Novel Packaging technologies

Wednesday, 16 July 2014 11:30 (45 minutes)

Presenter: Dr PATTI, Robert (Tezzaron Semiconductor (USA))

Session Classification: Second Morning Session

Contribution ID: 10

Type: **not specified**

The Veloce Emulator and its Use for Verification and System Integration of Complex Multi-node SOC Computing Systems (ie. the Next Generation Veloce Emulator)

Thursday, 17 July 2014 09:00 (1 hour)

Note that the lecture on “New Physics requirements and Technological challenges to be confronted by the Calorimetry in Particle Physics” is postponed to July 21st and will be given by Dr. Francesca Cavallari from Roma 1 University.

Presenter: VUILLEMIN, Laurent (MENTOR GRAPHICS)

Session Classification: Third Morning Session

Contribution ID: 11

Type: **not specified**

New calorimeters for Space experiments: Physics requirements and technological challenges

Thursday, 17 July 2014 10:00 (1 hour)

This lecture presented by P. Marrocchesi will include his material and the one provided by O. Adriani (Universita di Firenze) with whom P. Marrocchesi is also collaborating.

Presenter: Prof. MARROCCHESI, Pier Simone (Universita di Siena and INFN-Pisa (IT))

Session Classification: Third Morning Session

Contribution ID: 12

Type: **not specified**

New trends and different strategies on Triggering in High Energy Physics

Thursday, 17 July 2014 11:30 (1h 30m)

This lecture will introduce different Triggering schemes that include the case with or without triggering.

Presenter: Prof. HALL, Geoffrey (Imperial College Sci., Tech. & Med. (GB))

Session Classification: Third Morning Session

Contribution ID: 13

Type: **not specified**

On-detector Signal Processing for Large area tracking system based on Silicon strips

Friday, 18 July 2014 09:00 (1h 15m)

Presenter: Dr MERISI, Stefano (CERN (CH))

Session Classification: Fourth Morning Session

Contribution ID: 14

Type: **not specified**

Real time (Level-1) Track Triggering: Technological challenges

Friday, 18 July 2014 10:15 (1 hour)

Presenter: Dr MERISI, Stefano (CERN (CH))

Session Classification: Fourth Morning Session

Contribution ID: 15

Type: **not specified**

Large Area tracking systems based on Scintillating Fibers read out by SiPM's

Friday, 18 July 2014 11:45 (1h 15m)

This session will cover both the LHCb case in High Energy Physics and the Astrophysics High Energy application.

Presenter: Dr JORAM, Christian (CERN (CH))

Session Classification: Fourth Morning Session

Contribution ID: 16

Type: **not specified**

How & why pixels are becoming more & more intelligent (FE & readout electronics): lecture 1

Saturday, 19 July 2014 09:00 (1 hour)

Presenter: Prof. WERMES, Norbert (Universitaet Bonn (DE))

Session Classification: Fifth Morning Session

Contribution ID: 17

Type: **not specified**

How & Why Pixels are becoming more & more intelligent (FE & readout electronics): lecture 2

Saturday, 19 July 2014 10:00 (1 hour)

Presenter: Prof. WERMES, Norbert (Universitaet Bonn (DE))

Session Classification: Fifth Morning Session

Contribution ID: **18**

Type: **not specified**

How and Why Pixels are becoming more and more intelligent (sensors-part1): lecture 3

Saturday, 19 July 2014 11:30 (45 minutes)

Presenter: Prof. BORTOLETTO, Daniela (Purdue University (USA) and Oxford (UK))

Session Classification: Fifth Morning Session

Contribution ID: **19**

Type: **not specified**

Use of intelligent Pixels in Astrophysics

Contribution ID: 20

Type: **not specified**

Silicon Photonics: Optical Modulation and Detection (part1)

Monday, 21 July 2014 09:00 (1 hour)

Presenter: Dr VIVIEN, Laurent (Si-Photonics Lab (Paris-Sud University/CNRS) FR)

Session Classification: Sixth Morning Session

Contribution ID: 21

Type: **not specified**

Silicon Photonics: Optical Modulation and Detection (Part 2)

Monday, 21 July 2014 10:00 (1 hour)

Presenter: Dr VIVIEN, Laurent (Si Photonics Lab (Paris-Sud University/CNRS) FR)

Session Classification: Sixth Morning Session

Contribution ID: 22

Type: **not specified**

Data transmission needs and challenges for Frontier Particle Physics: The versatile link Project for LHC applications

Monday, 21 July 2014 11:30 (50 minutes)

Presenter: Prof. WEIDBERG, Anthony (University of Oxford (GB))

Session Classification: Sixth Morning Session

Contribution ID: 23

Type: **not specified**

New Trends in Silicon Photonics and Industrial Perspectives

Tuesday, 22 July 2014 09:00 (1 hour)

Presenter: Dr MALINGE, Jean Louis (Former CEO of KOTURA Inc. USA, expert in Si Photonics & Related Industrial Aspects)

Session Classification: Seventh Morning Session

Contribution ID: 24

Type: **not specified**

Novel Data Transmission wireless based technology for Frontier Applications

Tuesday, 22 July 2014 10:00 (1h 15m)

Presenter: Prof. BRENNER, Richard (Uppsala University (SE))

Session Classification: Seventh Morning Session

Contribution ID: 25

Type: **not specified**

Data Transmission Challenges and Needs for Frontier AstroPhysics: the SKA case

Tuesday, 22 July 2014 11:45 (1h 15m)

Presenter: Dr MCCOOL, Roshene (SKA Organisation, UK)

Session Classification: Seventh Morning Session

Contribution ID: 26

Type: **not specified**

Massive Parallel Computing: an overview panorama

Presenter: TBA

Contribution ID: 27

Type: **not specified**

Massive Parallel Computing: an overview panorama (Part 2)

Contribution ID: 28

Type: **not specified**

New Tools for Imaging

Contribution ID: 29

Type: **not specified**

Massive Parallel Computing based on GPU: introductory lecture

Thursday, 24 July 2014 11:30 (1h 30m)

Presenter: Dr KESTENER, Pierre (CEA/Maison de la Simulation, FR)

Session Classification: Ninth Morning Session

Contribution ID: **30**

Type: **not specified**

MPC needs and challenges in Particle Physics: The High Luminosity LHC case

Thursday, 24 July 2014 10:00 (1 hour)

Presenter: Dr LUJAN, Paul (Princeton University (US))

Session Classification: Ninth Morning Session

Contribution ID: 31

Type: **not specified**

Massive Parallel Computing Needs and Challenges in Astrophysics: the SKA case

Thursday, 24 July 2014 09:00 (1 hour)

Presenter: BROEKEMA, Chris (Netherlands Institute for Radio Astronomy, ASTRON)

Session Classification: Ninth Morning Session

Contribution ID: 32

Type: **not specified**

Some examples of optimized real time algorithms in fundamental and applied research

Contribution ID: 33

Type: **not specified**

New Test Infrastructures for Future Particle Physics Experiments or Upgrades

Presenter: JONES, Matthew Timothy (Purdue University (US))

Contribution ID: 34

Type: **not specified**

New Test Infrastructures for Future Particle Physics Experiments and Upgrades

Friday, 25 July 2014 09:15 (1h 15m)

Presenter: Prof. JONES, Matthew Timothy (Purdue University (USA))

Session Classification: Tenth Morning Session

Contribution ID: 35

Type: **not specified**

New tools for testing Advanced 3D technology based devices

Presenter: MENTOR GRAPHICS REPRESENTATIVE (TBA)

Contribution ID: 36

Type: **not specified**

EMBRACE an Ultra Wide Field of View Prototype for the Square Kilometer Array

Friday, 25 July 2014 11:30 (1h 30m)

Presenter: Dr TORCHINSKY, Steve (Observatoire de Paris and Nancay (FR))

Session Classification: Tenth Morning Session

Contribution ID: 37

Type: **not specified**

Physics Motivations for Level-1 track triggering at LHC and future HEP experiments

Friday, 18 July 2014 17:15 (1h 15m)

Presenter: Dr BUCHMUELLER, Oliver (Imperial College Sci., Tech. & Med. (GB))

Contribution ID: **38**

Type: **not specified**

3D technologies: new era for packaging and IC development

Wednesday, 16 July 2014 12:15 (45 minutes)

Presenter: Dr LAMY, Yann (CEA-LETI (FR))

Session Classification: Second Morning Session

Contribution ID: 39

Type: **not specified**

New Challenges in Signal Processing in Astrophysics: the SKA case

Wednesday, 16 July 2014 17:15 (1h 15m)

This talk completes the introductory lectures given on the first day concerning the challenges of the overall Signal in the Astrophysics case; this lecture could not be scheduled on Monday July 15.

Presenter: Dr FAULKNER, Andrew (Cambridge (UK))

Contribution ID: 40

Type: **not specified**

Real time Signal Processing, Data Filtering and High-Degree on-device data processing in Medical Imaging

Tuesday, 22 July 2014 17:15 (1h 15m)

Presenter: Dr GUERRA, Pedro (Universidad Politecnica de Madrid (SP))

Contribution ID: 41

Type: **not specified**

Why and How Pixels are becoming more and more intelligent (sensors-Part2): lecture 4

Saturday, 19 July 2014 12:15 (45 minutes)

Presenter: Prof. DALLA BETTA, Gian-Franco (INFN and University of Trento (IT))

Session Classification: Fifth Morning Session

Contribution ID: 42

Type: **not specified**

Data transmission Needs and Challenges for Frontier Particle Physics: Radiation Hardness and Longevity

Monday, 21 July 2014 12:20 (40 minutes)

Presenter: Prof. HOU, Suen (Academia Sinica (TW))

Session Classification: Sixth Morning Session

Contribution ID: 43

Type: **not specified**

Intelligent Pixels: The SOIPiX R&D programme and applications

Saturday, 19 July 2014 17:15 (1h 15m)

Presenter: Prof. CORTINA GIL, Eduardo (Université catholique de Louvain (BE))

Contribution ID: 44

Type: **not specified**

Modelling Sophisticated Signal Processing Architectures in Astrophysics, HEP and Medical Imaging

Presenter: Dr MILLET, Philippe (THALES Research & Technology (FR))

Contribution ID: 45

Type: **not specified**

Poster Presentations

The School participants will present their posters. This will start after the Labs session. Stay tuned.

Contribution ID: 46

Type: **not specified**

Overview of Cosmology with SKA, the Square Kilometer Array

Tuesday, 15 July 2014 17:15 (1h 15m)

Summary

SKA is a new technology radio-telescope array, about two orders of magnitude more sensitive and rapid in sky surveys than present instruments. It will be able to detect and measure the redshifts of billions of galaxies at the redshifts up to $z=2$, to probe through baryonic acoustic oscillations the nature of dark energy; it will probe the dark age of the universe, just after recombination, and during the epoch of reionisation ($z=6-15$); it will be the unique instrument to map the atomic gas in high redshift galaxies, and determine the amount and distribution of dark matter in the early universe. We will discuss these exciting perspectives, which will realize around 2020.

Presentation type

Lecture

Presenter: Prof. COMBES, Françoise (Observatoire de Paris & LERMA (FR))

Contribution ID: 49

Type: **not specified**

Front-End Multiplexing

Wednesday, 23 July 2014 10:00 (1 hour)

Presenter: Dr PRELE, Damien (APC Laboratory/CNRS)

Session Classification: Eighth Morning Session

Contribution ID: **50**

Type: **not specified**

Compressed Sensing and Sparsity: LECTURE CANCELED

NOTE: due to a last minute personal problem Jerome Bobin just informed me he will not be able to give this lecture. Thus the morning session will start at 10h15 am

Presenter: Dr BOBIN, Jerome (Comostat Group/CEA)

Contribution ID: 51

Type: **not specified**

Radio Aperture synthesis as a practical example of sparse signal reconstruction

Wednesday, 23 July 2014 11:30 (1h 30m)

Presenter: Dr GIRARD, Julien (CEA-Cosmostat)

Session Classification: Eighth Morning Session

Contribution ID: 52

Type: **not specified**

Massive Parallel Computing: The exascale Challenges

Wednesday, 23 July 2014 17:15 (1h 15m)

Presenter: Dr SAWLEY, Marie Christine (Exascale Lab Center -INTEL)

Contribution ID: 54

Type: **not specified**

Public Lecture 1: The Higgs Boson and the Two Infinities – Le Boson de Higgs et les Deux Infinis

Thursday, 17 July 2014 20:00 (2 hours)

This Public Event will be given in english by Michel SPIRO, Physicist, Conseiller Scientifique au Commissariat a l'Energie Atomique, Former President of CERN Council as well as Professor at the Ecole Polytechnique.

The Public lecture will be given in the Amphitheater BUFFON in the University PARIS DIDEROT Campus (Paris 13) and will be film recorded.

Cette Presentation Grand Public sera donnee par Michel SPIRO, Physicien, Conseiller Scientifique au Commissariat a l'Energie Atomique, precedent President du Conseil du CERN et Professeur a l'Ecole Polytechnique. Michel Spiro est auteur de plusieurs ouvrages scientifiques accessibles a un large public et a donne de nombreuses conferences ces dernieres annees pour differents publics y inclus large audience.

Presenter: Prof. SPIRO, Michel (CEA/IRFU,Centre d'etude de Saclay Gif-sur-Yvette (FR))

Contribution ID: 59

Type: **not specified**

First Lab session

Tuesday, 15 July 2014 14:00 (2h 45m)

The first session on July 15 will be devoted to the presentation of all the 10 Computing Labs and 10 Practical Labs by their authors. This will be a plenary session held in the BioPark Auditorium as the other plenary sessions.

The participants will have to choose the “Menu of Labs” they want to perform. Students must choose sessions that do not correspond to their expertise and/or current work.

The organizers will prepare accordingly the overall work plan and schedule for the whole duration of the school. The first parallel sessions will thus start on July 16,

Contribution ID: **61**

Type: **not specified**

Digital Detector Emulator Overview

Friday, 25 July 2014 10:30 (30 minutes)

Presenter: GHARBI, Mohammed (CAEN)

Session Classification: Tenth Morning Session

Contribution ID: 63

Type: **not specified**

New Physics requirements and Technological challenges to be confronted by the Calorimetry in Particle Physics

Monday, 21 July 2014 17:15 (1h 15m)

Presenter: Dr CAVALLARI, Francesca (Universita e INFN, Roma I (IT))

Contribution ID: 64

Type: **not specified**

Towards the New Generation of Neutrino Observatory: Physics and Technological Challenges

Thursday, 17 July 2014 17:15 (1h 15m)

Presenter: Prof. PATZAK, Thomas (APC-CNRS and University Paris-Diderot)

Contribution ID: 65

Type: **not specified**

Poster 1

Thursday, 24 July 2014 17:00 (10 minutes)

Presenter: DEY, Thomas (Philips Research)

Session Classification: POSTER SESSION

Contribution ID: **66**

Type: **not specified**

Poster 2

Thursday, 24 July 2014 17:10 (10 minutes)

Presenter: JUNG, Aera (APC, University Paris Diderot)

Session Classification: POSTER SESSION

Contribution ID: 67

Type: **not specified**

Poster 3

Thursday, 24 July 2014 17:20 (10 minutes)

Presenter: ALIPOUR TEHRANI, Niloufar (Eidgenoessische Tech. Hochschule Zuerich (CH))

Session Classification: POSTER SESSION

Contribution ID: **68**

Type: **not specified**

Poster 4

Thursday, 24 July 2014 17:30 (10 minutes)

Presenter: GRAVERINI, Elena (Universitaet Zuerich (CH))

Session Classification: POSTER SESSION

Contribution ID: **69**

Type: **not specified**

Poster 5

Thursday, 24 July 2014 17:40 (10 minutes)

Presenter: KONSTANTINOU, Georgios (Universidad Carlos III de Madrid)

Session Classification: POSTER SESSION

Contribution ID: 70

Type: **not specified**

Poster 7

Thursday, 24 July 2014 18:00 (10 minutes)

Presenter: DONI, Michele (NIKHEF (NL))

Session Classification: POSTER SESSION

Contribution ID: 71

Type: **not specified**

Poster 8

Thursday, 24 July 2014 18:10 (10 minutes)

Presenter: RICHARDS, Sophie Elizabeth (University of Bristol (GB))

Session Classification: POSTER SESSION

Contribution ID: 72

Type: **not specified**

Poster 9

Thursday, 24 July 2014 18:20 (10 minutes)

Presenter: SIEGEL, Seth (CALTECH)

Session Classification: POSTER SESSION

Contribution ID: 73

Type: **not specified**

Poster 10

Thursday, 24 July 2014 18:30 (10 minutes)

Presenter: DONATI, Matia (XFEL-DESY)

Session Classification: POSTER SESSION

Contribution ID: 74

Type: **not specified**

Poster 11

Thursday, 24 July 2014 18:40 (10 minutes)

Presenter: ALI, Wahajat (Scuola Superiore Sant'Anna, Pisa)

Session Classification: POSTER SESSION

Contribution ID: 75

Type: **not specified**

Poster 12

Thursday, 24 July 2014 18:50 (10 minutes)

Presenter: VIGNETTI, Matteo (Institut de Nanotechnologie, INL, CNRS, Lyon)

Session Classification: POSTER SESSION

Contribution ID: 76

Type: **not specified**

Poster 6

Thursday, 24 July 2014 17:50 (10 minutes)

Presenter: MORESCALCHI, Luca (INFN-Pisa)

Session Classification: POSTER SESSION