



The Abdus Salam

**International Centre
for Theoretical Physics**

Advanced Workshop on Modern FPGA Based Technology for Scientific Computing

**13 - 24 May 2019
ICTP**

**Venue: Giambiagi Lecture Hall (AGH)
Informatics Laboratory (AGH)**

**Organizers: Andres Cicuttin (ICTP)
Maria Liz Crespo (ICTP)**



Typical Daily Program (9:00 – 18:30)

Timetable	
9:00 - 10:30	lecture
10:30 - 11:00	coffee-break
11:00 - 12:30	lecture
12:30 - 14:00	lunch
14:00 - 15:30	lecture
15:30 - 16:00	coffee-break
16:00 - 17:00	lab tutorial
17:00 - 18:30	hands-on

Secretariat: Monica Ancuta (ICTP), smr3289@ictp.it



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for Theoretical Physics**

Participants

- > 200 applications
- 45 participants from 21 different countries

Guatemala

Peru

Cuba

Argentina

Brazil

Colombia

Mexico

Costa Rica

Algeria

France

Italy

Malaysia

Iran

Iraq

India

Philippines

Kenya

Nigeria

Afghanistan

Pakistan

Cameroon



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Faculty

- 14 lecturers
- 7 lab. assistants

USA

Italy

Poland

Argentina

Guatemala

Colombia

France

Germany

Spain

India

Sri Lanka

Scientific Computing on FPGA based SoC

Digital arithmetic and numerical representations
Floating point operators: Square Root and Division
Pirouz BAZARGAN SABET (LIP6, Paris, France)

The JANUS project
Sebastiano Fabio SCHIFANO (Janus, University of Ferrara)

EuroEXA project and FPGA
Enrico CALORE (Janus, University of Ferrara)

BondMachine, a mouldable computer architecture
Mirko MARIOTTI (University of Perugia, Perugia)

FPGAs computing just right thanks to application-specific arithmetic
The FloPoCo arithmetic core generator
Florent DE DINECHIN (Lyon, France)

Scientific Computing on FPGA based SoC

Front-Ends and DAQ for Particle Physics experiments

The new generation of Intelligent FPGA based DAQ architectures

Igor KNONOROV (TUM, Munich)

Feature Extraction from Waveforms and Data Compression

Grzegorz PASTUSZAK (Warsaw University of Technology, Warsaw, Poland)

High-Performance Computing at the ICTP

Ivan GIROTTO (ICTP)

From Advanced Instrumentation Towards Supercomputing

Andres CICUTTIN (ICTP)

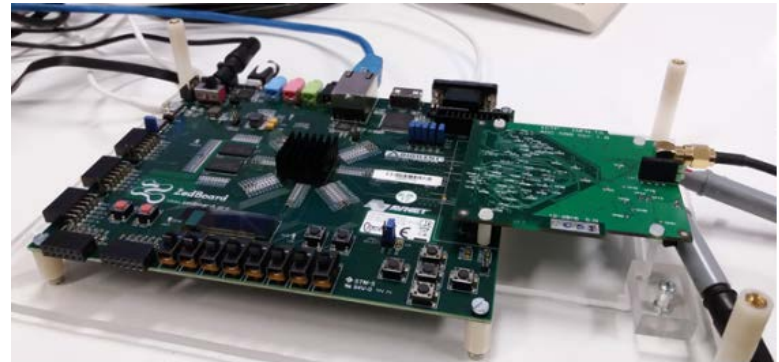


Laboratory activities

Cristian Sisterna

FPGA-based Systems-On-Chip Technology: Hardware and Software

- **Lab activities:**
 - Vivado IDE 2018.3.1
 - Zynq-7 family SoC
 - ZedBoard development kit





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Laboratory activities

- **Lab tutorials:**

Romina Molina: Building a complete Embedded System

Luis Garcia Ordoñez: Custom IP Core
FloPoCo for Scientific Computing

Rodrigo Melo: Data transfer with DMA
FPGA-Processor Interface



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Laboratory activities

Fernando Rincon Calle

- FreeRTOS operating system for SoC
- TCP/IP communication: The LwIP library
- **Lab Tutorials:** First steps with FreeRTOS & LwIP library

Bruno Valinoti: How to access the SoC from a host computer

Kasun Mannatunga: Advanced project based on SoC for Scientific Computing



From Hi-Tech Companies

Nizar ABDALLAH (Microsemi/Microchip, USA)

- The Era of All Programmable SoC: challenges for instrumentation and supercomputing
- The RISK V architecture

Abelardo JARA-BERROCAL (Megh Computing, USA)

- Introduction to Parallel Computing using FPGAs
- Writing OpenCL programs for FPGAs
- Software Application Stack for FPGAs (OPAE and SIRA)
- Developing and Debugging RTL-based Accelerator Units on FPGAs



Workshop Webpage

- <http://indico.ictp.it/event/8680/overview>

Social Activities

- Welcome reception (Tuesday 14 at 19:30, AGH Cafeteria)
- Farewell reception (Thursday, 23 at 19:30, AGH Cafeteria)
- Group Picture (Thursday, 16 at 10:50)

WHAT ABOUT YOU?

- Your University and Country
- Your Area of Research



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ICTP Programmes

- <https://www.ictp.it/programmes.aspx>
- **ICTP fellowships**
 - Sandwich Training Educational Programme (STEP) for PhD students
<https://www.ictp.it/programmes/step.aspx>
 - Training and Research in Italian Laboratories (TRIL at the MLAB)
<https://www.ictp.it/tril.aspx>
- **Associates and Federated Institutes**
 - https://www.ictp.it/programmes/career-development.aspx#anchor_1159



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Scientific Calendar

- <https://www.ictp.it/scientific-calendar.aspx>
- **Want to propose a conference, school or workshop?**
 - <https://www.ictp.it/call-for-proposals.aspx>
- **2019**
 - Regional School and Conference on Fully-Programmable Systems-On-Chip for Scientific Instrumentation (Gauhati University, India)
<http://indico.ictp.it/event/8733/>