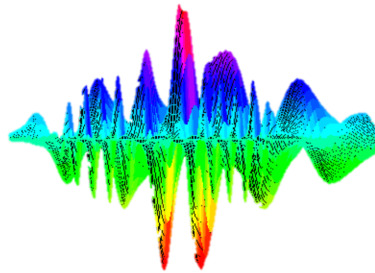


University of Padova,
Dept. of Information Engineering

2014 Summer School of Information Engineering,

Signal processing in ICT



Bressanone (BZ), Italy
July 7 – July 11, 2014

the co-Directors

prof. Gaudenzio Meneghesso, gauss@dei.unipd.it

prof. Silvano Pupolin, pupolin@dei.unipd.it

All info about Conference can be found on web:

<http://www.dei.unipd.it/ssie>

University of Padova, Dept. of Information Engineering

2014 Summer School of Information Engineering,

Bressanone (Brixen, BZ), Italy - July 7 - July 11, 2014

Signal processing in ICT

- Monday 7/7** **(Casa della Gioventù)**
9:00 - 12:30 **Luca Benini** *University of Bologna DEI and ETH Zurich, D-ITET* "Parallel digital signal processing in a mW power envelope: how and why"

14:00 - 16:30 PhD students Presentations
- Tuesday 8/7:** **(Casa della Gioventù)**
9:00 - 12:30 **Andrea Zanella**, *Università di Padova (DEI)*, "Signal processing: a networking perspective"

14:00 - 17:00 PhD students working Groups
- Wednesday 9/7: (Casa della Gioventù)**
9:00 - 12:30 **Nicola Laurenti**, *Università di Padova (DEI)*, "Signal processing for unconditional security"
- Thursday 10/7: (Casa della Gioventù)**
9:00 - 12:30 **Pietro Zanuttigh**; *Università di Padova (DEI)*; "Image and video analysis: feature descriptors and their applications"

14:00 - 16:30 PhD students Presentations
- Friday 11/7:** **(Casa della Gioventù)**
9:00 - 12:30 **Marco Chiani**; *Università di Bologna (DEI)*; "Some recent results in signal processing for communication and localization"

12:30 - 13:00 SSIE Closing, (Gaudenzio Meneghesso, Silvano Pupolin, Co-Directors)

General info

All info can be found at: <http://www.dei.unipd.it/ssie>

Participation at the SSIE:

All those young researchers and PhD students who wish to participate at the SSIE must send an e-mail to: gauss@dei.unipd.it

How to Submit a Proposal

All those young researchers and PhD students who wish to present their research activities at the Workshop, should send an email to gauss@dei.unipd.it

clearly indicating:

- Name
- Affiliation/Postal Address
- Phone/Fax
- Contact Email
- Title of the Presentation
- Abstract (e-mail format is also OK)

Please use English language. **The deadline for submitting proposals is June 30th 2014.**

Presenting your Research Activity at SSIE

Each presenter will be assigned a slot of 20 minutes, including 5 minutes for questions. All presentations will be in English.

Registration & Fee

The organizing committee decided that the School has no registration fee for PhD students, but participants will have to pay for their travel and living expenses.

For organization purposes all the participants are invited to Register by sending an e-mail either to gauss@dei.unipd.it

with subject: Registration to Summer School on Information Engineering 2014

clearly indicating:

- Name
- Affiliation/Postal Address
- Phone/Fax
- Contact Email

Accommodation:

As for the past years we have an agreement with **Gruener Baum** hotels (www.gruenerbaum.it) in Brixen which will give lodging for all the persons attending the Summer School of Information Engineering (students, teachers and accompanying persons) at discount prices (**July 6th 2014 - July 11th 2014 only**) (see SSIE website for details: <http://www.dei.unipd.it/ssie>)

Net prices	
single room	64.50 Euro per person per day (breakfast included)
double room	50,00 Euro per person per day (breakfast included)
double room (single use)	85.50 Euro per person per day (breakfast included)
half pension supplement	17.00 Euro per person per day
meal	9,00 Euro for a first course
Discount prices if staying for 3 or more nights	
single room	53.50 Euro per person per day (breakfast included)
double room	42.50 Euro per person per day (breakfast included)
double room (single use)	69.50 Euro per person per day (breakfast included)

ABSTRACTS

Luca Benini

University of Bologna DEI and ETH Zurich, D-ITET

“parallel digital signal processing in a mW power envelope: how and why?”

Abstract: With the widespread diffusion of distributed and wearable sensors, the requirements for ultra-low power sensor data stream processing and fusion are becoming more stringent. In this talk I will discuss recent trends in near-threshold parallel processing which make it possible to break the pJ/op barrier at a total power envelope of a few mW. In this regime, sensor interfaces become the power bottleneck and new solutions pushing heterogeneous integration are required.

Andrea Zanella,

Università di Padova (DEI),

“Signal processing: a networking perspective”

Abstract: This tutorial will illustrate how signal processing plays a pivotal role in many fields of the networking domain. We will start with a broad overview of the main challenges in modern networks and discuss how signal processing gets into p-layer in this domain. To substantiate the discussion, we will successively consider specific networking challenges that are tackled by adopting suitable signal processing techniques at different levels of the protocol stack. We will show how context-information can be inferred from suitable processing of PHY-layer signals and exploited to improve the high-level network performance, or to support location-dependent services. Then, we will see how signal processing can help designing network protocols in wireless sensor networks. Finally, we will show an example of how signal processing methods coming from (apparently) unrelated areas, such as that of cognitive science, can be applied into our domain for the optimization of modern communication systems.

Nicola Laurenti,

Università di Padova (DEI),

“Signal processing for unconditional security”

Abstract: As our personal data and communication are ever more often transmitted and stored in electronic form, concerns are growing about whether we can maintain some control over them and to what extent. Such interest has led to the development of the field of information and communications security well beyond the traditional realm of military communications. In particular, the unconditional security paradigm guarantees a given level of security that is independent of the computational capabilities of the adversary, by leveraging the generation and processing of (true) random signals. In this tutorial we will review the application of signal processing techniques in providing several security services, such as secrecy, anonymity, signal authentication and integrity protection, watermarking and fingerprinting, with a particular focus on those mechanisms that ensure unconditional security. Application examples will range from secret wireless communication at the physical layer, to the protection of multimedia content.

Pietro Zanuttigh;

Università di Padova (DEI);

“Image and video analysis: feature descriptors and their applications”

Abstract: This tutorial will cover some recent advancements in the field of image and video analysis. The first part will be devoted to the extraction of relevant features from images and videos like edges, corners and other distinctive points. The construction of reliable descriptors for the points of interest will then be addressed with a particular focus on the Scale-Invariant Feature Transform (SIFT), a method that has attracted a huge interest in recent years. Finally some examples of the usage of the extracted features in applications like image mosaicking, 3D reconstruction and motion estimation in videos will be shown.

Marco Chiani;

Università di Bologna (DEI);

“Some recent results in signal processing for communication and localization”

Abstract: The possibility to communicate with nodes and to accurately localize them by using wireless techniques is of central importance for emerging applications in the Internet of Things (IoT) scenario. After a review of the main results in detection and estimation theory, we will present some recent results in signal processing for communication and localization. The talk will cover in particular:

- model order selection based on information theoretic criteria for signals counting, for ranging and for spectrum sensing;
- interference subtraction and codes on graphs for the random access in the IoT: Coded Slotted Aloha.
- recent results on the distribution of the eigenvalues of random Wishart matrices with applications to wireless MIMO systems and to spectrum sensing.