



## CURRICULUM VITAE (brief)

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PLACE / DATE OF BIRTH  
Geneva, Switzerland – Jan. 26, 1962

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### CURRENT POSITION

Professor, Signals & Systems Chair, Signals & Communications Laboratory Head – University of Brescia, Italy.

### EDUCATION

- 04/1984 – 06/1987: Ph.D. in Technical Sciences, Electrical Eng. Dept., EPFL, Switzerland.
- 10/1979 – 07/1981; 10/1982 – 01/1984: Electrical Engineering Diploma, EPFL, Switzerland.
- 09/1981 – 05/1982: international exchange program, CMU, Pittsburgh, USA.

### PROFESSIONAL CAREER

- 03/2000 – current  
Professor, Head of the *Signals and Communications Laboratory*, Signals & Systems Chair  
In charge of
  - MS program in Communication Technologies and Multimedia
  - PhD program in Communication Engineering
  - Recruitment in Signal Processing, Information Theory, Communication and Networking.
- 03/1992 – 02/2000  
Associate Professor of Communication Engineering  
*Achievements*
  - Established research in Signal Processing and Communications at the University of Brescia.
  - Definition of an education curriculum in communications for Electrical Engineering graduates.
  - Definition and coordination of the University of Brescia Ph.D. Program in Information Engineering.
- 04/1991 – 03/1992  
Scientific Associate, Research Head, Signal Processing Laboratory, EPFL
- 09/1988 – 03/1991  
Member of Technical Staff, Bell Labs Research, Visual Communications Research Department, Information Systems Research Laboratory, AT&T Bell Laboratories, Holmdel (NJ) U.S.A – conducted research for the advancement of Digital Television.
- 10/1987 – 09/1988

Post-doctoral fellow, Communications Research Laboratory, University of California, Santa Barbara (CA), U.S.A.

- 03/1984 – 09/1987  
Research Assistant, Signal Processing Laboratory, EPF-Lausanne, Switzerland.

#### **OTHER CURRENTLY HELD POSITIONS**

- 06/2009 – current: member of the Management Board of the Italian directorate in Telecommunication and Information Technology (GTTI), nationally elected by academic representatives of all academic institutions operating in the field of Communications, Signal Processing and Networking as its Secretary since in 2012.
- 01/2014 – current: Vice-president and Member of the Board of the “Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT)”, Consortium of Italian Universities managing internationally and nationally funded research projects and setting-up National laboratories in the ICT domain; current annual turn-over (15 M€).
- 1996 – current: University of Brescia Dean of Engineering or Department Delegate to International Relations, to promote student and researcher mobility programs, and establish double or joint degree programs (BS, MS or PhD).

#### **MAJOR PROFESSIONAL ACHIEVEMENTS**

##### 1. From a research perspective :

- Introduced novel object based representation of images through effective segmentation from Region Adjacency Graphs (starting from quadtrees) for the compression of visual information; the quadtree representation became a key component for video compression standards (H.264/AVC and HEVC).
- Contributed to the understanding and the definition of key concepts in video compression such as motion-compensated interpolation, and multiple reference frame motion compensated prediction currently widely used for Digital Television, in current video standards.
- Initiated multimodal approach to describe temporal dependencies of audio and visual features in order to support semantic and affective representation of audio-visual documents
- Introduced a framework for the optimal approximation of discrete-time signals in linear spaces under the  $l^\infty$  norm.
- Revisited the concept of unique decodability of block codes.

##### 2. Management & Leadership:

- Set-up of a research laboratory in a newly instituted Italian University, currently leading a group of ~15 people (1 Associate professor, 5 assistant professors, 2 postdocs, 5 PhD students).
- Definition of an education program in Communication at both undergraduate and graduate level, including 2 Ph.D. programs in Information Engineering and in Communication Engineering.
- In charge of recruiting in Signal Processing, Information Theory, Computer networks to support of the growth and new research initiatives in the field.
- Initiated and established since 1999 several double degree programs at the Master level with various International partners for the School of Engineering of the University of Brescia (e.g., Georgia Institute of Technology (MSEE, MSCS, MSME), Université Pierre et Marie Curie (MSAE)); similarly experimented a series of jointly supervised of PhD candidates in the ICT field that led to the award of a double degree with the partner institution.

#### **SIGNALS AND COMMUNICATIONS LABORATORY RESEARCH DIRECTIONS**

The Signals and Communications Laboratory (SCL) carries out activities in a variety of fields of modern signal processing and Information Theory. SCL undertakes both basic and application oriented research. Recently interdisciplinary research has also been undertaken (embracing domains such as networking and

communications, but also touching social and life sciences), due to the evolution of multimedia communication services and their impact on the social sphere.

Application oriented research is funded through direct collaboration with multinational Companies (e.g. Philips, ST microelectronics, TIM) or within ICT collaborative programs funded by the European Commission. Basic research continues to be carried out thanks to institutional funding (Italian Ministry of Research and Education (MIUR)).

SCL has contributed to the development of international standards in particular for the design of new visual communication and multimedia information management (ISO & ITU such as MPEG, HEVC).

SCL actively supports student traineeship at graduate and undergraduate level both in Europe and North American institutions, so as to share mutual expertise with a great benefit for the growth of the laboratory activities.

SCL contributes to the development of innovation through direct participation or collaboration with high-end ICT companies: Yonder Labs ([www.yonderlabs.com](http://www.yonderlabs.com)), Open Technologies (<http://www.scanner3d.it>), Copan Italia (<http://www.copanitalia.com>)

SCL research activities are oriented in the following directions :

1. Multimedia communication

- Machine Learning: Multimedia content analysis for automatic annotation of objects and events, semantic and affective movie representation, audio analysis, music transcription, gesture recognition with application to audio-visual summarization, advanced editing and visualization, multimedia information retrieval, movie recommendation, film-based storytelling (movie-telling).
- Visual communications: Scalable Video Coding, Distributed Video Coding, Volumetric Medical Image Compression, HDR imaging, 3D surface data acquisition; with the usage of innovative key technologies (wavelet based, distributed video coding, ...) and with significant contributions to international standards (JP2k, H.264, MPEG-4/AVC & SVC, HEVC...)

2. Mathematical models for signal representation (l-infinity approximation, signal decomposition, alternative linear spaces, ...)

3. Source and channel coding (unique decodability, probability of error bounds for Classical and Classical-Quantum channels<sup>1</sup>, ...)

## TEACHING EXPERIENCE

Taught several fundamental courses in Signal Processing and Communications, with classes ranging from ~10 to ~200 students.

- Advanced topics in DSP: 2006 – current
- Computer Graphics: 1988 (Computer Science course)
- Digital Image Processing: 1988, 1992 – 1993, 2005 – 2010
- Digital Signal Processing: 1988, 1994 – 2004
- Information Theory: 2002 – 2004
- Multimedia Information Coding and Description: 2003 – current
- Signals & Systems: 1992 – 2015
- Stochastic processes: 1992 – current

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<sup>1</sup> Marco Dalai, Best 2014 IT paper award

## MISCELLANEOUS OTHERS

1. IEEE Fellow for contributions to image and video compression and multimedia semantic content analysis (as of 01/01/2018)
2. Founding member (2009) of the Italian directorate in Telecommunication and Information Technology (GTTI) to support the coordination of academic research, education and quality activities in Italy.
3. Expert evaluator since 1997 for project funding and auditing through COST and European Commission Framework Programs (FP4/FP5/FP6/FP7) and more recently the H2020 program.
4. Member of various scientific Societies: (i) IEEE Circuits and Systems Society; (ii) IEEE Communication Society; (iii) IEEE Information Theory Society; (iv) IEEE Signal Processing Society; (v) European Association for Signal Processing.
5. Current and/or past Member of Editorial Board or Area Editor of various International Journals, e.g. *Journal of Visual Communication and Image Representation*, *Signal Processing: Image Communication*, *International Journal of Image and Video Processing*.
6. Scientific Management of international conferences/initiatives (e.g., General Chairman of the 2001 *Content Based Multimedia Indexing Workshop*, Brescia, Italy; of the 2002 *International Tyrrhenian Workshop on Digital Communications*, Capri, Italy; Tutorial Chair of the 2006 *International Conference on Image Processing (ICIP)*, Genoa, Italy; Technical Program Chair of the 2007 *1st International Conference on Immersive Telecommunications*; General Chairman of the *11th International Workshop on Image Analysis For Multimedia Interactive Services*, 2010; Organizer of the first edition of the *IEEE SPS Summer School on Signal Processing*, 2015, Garda Lake, Italy
7. Scientific advisor to various high-tech start-up companies

## LANGUAGES

- English      fluent (Listening / Reading / Writing)
- French      fluent (Listening / Reading / Writing), mother tongue
- German      basic proficiency (Listening / Reading / Writing)
- Italian      fluent (Listening / Reading / Writing), mother tongue
- Spanish      basic proficiency (Listening / Reading)

Brescia, Apr. 17<sup>th</sup>, 2018

Signature: .....

