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Short Bio: Tomaso Erseghe was born in 1972. He received the Laurea degree, *with honors*, and the Ph.D. degree in Telecommunication Engineering from the University of Padova, Italy, respectively in 1996 and 2002. From January 1997 to April 1999 he was with Snell & Wilcox R&D Department working on video standard conversion and video archive restoration. He then joined the Department of Information Engineering, University of Padova as an Assistant Professor in December 2002. From May 2017 he is an Associate Professor. His research interests have covered the fields of network science, coding in the finite blocklength regime, distributed algorithms for telecommunications and smart grid optimization, ultra-wideband transmission systems design, spectral analysis of complex modulation formats, fractional Fourier transforms and their applications, image processing and compression.

Academic positions

- ✓ Università degli Studi di Padova, Italy
Associate Professorship
Since 1st May 2017
- ✓ Università degli Studi di Padova, Italy
Assistant Professorship (*Ricercatore*)
20/12/2002-30/4/2017

Work experience in industry

- ✓ Snell & Wilcox Ltd, UK
R&D researcher from Jan. 1997 to Apr. 1999
Working on video standard conversion and video archive restoration

Education

- ✓ Università degli Studi di Padova, Italy
Laurea Degree (Master level) in Telecommunication Engineering
(*Laurea in Ingegneria delle Telecomunicazioni*)
Final thesis on "fractional Fourier transforms" discussed on 5th Nov. 1996
Grading: full marks with honors (*110 e lode*)
- ✓ Università degli Studi di Padova, Italy
Ph.D. Degree in Electronic and Telecommunication Engineering
(*Dottorato in Ingegneria Elettronica e delle Telecomunicazioni*)
Final thesis on "UWB communication techniques" discussed on 1st Feb. 2002

Submitted

- S1. M. Ceccon, **T. Erseghe**, "A distributed algorithm for the reconstruction problem in graph signal processing," submitted to *IEEE Signal Processing Letters*, June 2017.

Books

- B1. **T. Erseghe**, *Channel coding*, ISBN 978-88-6938-088-4, Padova University Press, Padova, September 2016.
B2. N. Benvenuto, R. Corvaja, **T. Erseghe**, N. Laurenti, *Communication Systems: fundamentals and design methods*, ISBN 978-0-470-01822-4 (P/B), Wiley & Sons, 2006.

Book chapters

- Bc1. **T. Erseghe**, S. Tomasin, P. Tenti, "Efficient management of locally generated powers in micro grids," in *Communication and Networking in Smart Grids*, Prof. Yang Xiao Editor, Auerbach Publications, Taylor & Francis Group, pp. 57-78, ISBN 978-1-4398-7873-6, CRC Press, April 25, 2012.
Bc2. **T. Erseghe**, "Digital modulation systems," in *Principles of Communications networks and systems*, N. Benvenuto and M. Zorzi Editors, pp. 251-360, ISBN 978-0-470-74431-4, Wiley & Sons, September 2011.
Bc3. N. Laurenti, **T. Erseghe**, "Deterministic and random signals," in *Principles of communications networks and systems*, N. Benvenuto and M. Zorzi Editors, pp. 27-130, ISBN 978-0-470-74431-4, Wiley & Sons, September 2011.
Bc4. L. Baldini, D. Manstretta, **T. Erseghe**, N. Laurenti, A. Liscidini, R. Castello, "Reconfigurable multi-band OFDM UWB receivers," in *Circuits and systems for future generations of wireless communications*, A. Tasic, W.A. Serdijn, L.E. Larson, and G. Setti Editors, Springer, pp. 27-52, May 16, 2009.
Bc5. G. Cariolaro, **T. Erseghe**, "Pulse position modulation," in *Wiley Encyclopedia of Telecommunications*, J.G. Proakis Editor, Wiley & Sons, Vol. 4, pp. 2030-2042, December 2002.

Journal papers

- J1. N. Piovesan, **T. Erseghe**, "Cooperative localization in WSNs: a hybrid convex/non-convex solution," *IEEE Transactions on Signal and Information Processing over Networks*, Vol. 4, No. 1, pp. 162-172, March 2018.
J2. **T. Erseghe**, "Coding in the finite-blocklength regime: Bounds based on Laplace integrals and their asymptotic approximations," *IEEE Transactions on Information Theory*, Vol. 62, No. 12, pp. 6854-6883, December 2016.
J3. **T. Erseghe**, "On the evaluation of the Polyanskiy-Poor-Verdu converse bound for finite blocklength coding in AWGN," *IEEE Transactions on Information Theory*, Vol. 61, No. 12, pp. 6578-6590, December 2015.
J4. **T. Erseghe**, "A distributed and maximum-likelihood sensor network localization algorithm based upon a non-convex problem formulation," *IEEE Transactions on Signal and Information Processing over Networks*, Vol. 1, No. 4, pp. 247-258, December 2015.
J5. **T. Erseghe**, "A distributed approach to the OPF problem," *EURASIP Journal on Advances in Signal Processing (open access)*, special issue on *Advanced signal processing techniques and telecommunications network infrastructures for Smart Grid analysis, monitoring and management*, Vol. 45, pp. 1-13, May 2015.
J6. **T. Erseghe**, "Distributed optimal power flow using ADMM," *IEEE Transactions on Power Systems*, Vol. 29, No. 5, pp. 2370-2380, September 2014.
J7. **T. Erseghe**, A. Zanella, C. Codemo, "Optimal and compact control policies for energy storage units with single and multiple batteries," *IEEE Transactions on Smart Grids*, Vol. 5, No. 3, pp. 1308-1317, May 2014.
J8. A. R. Di Fazio, **T. Erseghe**, E. Ghiani, M. Murrioni, P. Siano, F. Silvestro, "Integration of renewable energy sources, energy storage systems, and electrical vehicles with smart power distribution networks," *Springer-Verlag Journal of Ambient Intelligence and Humanized Computing*, Vol. 4, No. 6, pp. 663-671, December 2013.
J9. **T. Erseghe**, A. Zanella, C. Codemo, "Markov decision processes with threshold based piecewise linear optimal policies," *IEEE Wireless Communication Letters*, Vol. 2, No. 4, pp. 459-462, August 2013.

- J10. **T. Erseghe**, S. Tomasin, A. Vigato, "Topology estimation for smart micro grids via powerline communications," *IEEE Transactions on Signal Processing*, Vol. 61, No. 12, pp. 3368-3377, July 2013.
- J11. **T. Erseghe**, S. Tomasin, "Power flow optimization for smart micro grids by SDP relaxation on linear networks," *IEEE Transactions on Smart Grid*, Vol. 4, No. 2, pp. 751-762, June 2013.
- J12. **T. Erseghe**, "A distributed and scalable processing method based upon ADMM," *IEEE Signal Processing Letters*, Vol. 19, No. 9, pp. 563-566, September 2012.
- J13. **T. Erseghe**, "Schmidl-Cox-like frequency offset estimation in time-hopping UWB," *IEEE Transactions on Wireless Communications*, Vol. 10, No. 12, pp. 4041-4047, December 2011.
- J14. **T. Erseghe**, D. Zennaro, E. Dall'Anese, L. Vangelista, "Fast consensus by the alternating direction multipliers method," *IEEE Transactions on Signal Processing*, Vol. 59, No. 11, pp. 5523-5537, November 2011.
- J15. **T. Erseghe**, A. Cipriano, "Maximum likelihood frequency offset estimation in multiple access time-hopping UWB," *IEEE Transactions on Wireless Communications*, Vol. 10, No. 7, pp. 2040-2045, July 2011.
- J16. G. Cariolaro, **T. Erseghe**, N. Laurenti, G. Pierobon, "New results on the spectral analysis of multi-h CPM signals," *IEEE Transactions on Communications*, Vol. 59, No. 7, pp. 1893-1903, July 2011.
- J17. **T. Erseghe**, L. Vangelista, "Exact analytical expression of Schmidl-Cox signal detection performance in AWGN," *IEEE Comm. Letters*, Vol. 14, No. 5, pp. 378-380, April 2010.
- J18. **T. Erseghe**, N. Laurenti "An analysis of GLRT packet detection for WiMedia UWB applications," *IEEE Transactions on Vehicular Technology*, Vol. 59, No. 3, pp. 1229-1241, March 2010.
- J19. **T. Erseghe**, S. Tomasin, "UWB WPAN receiver optimization in the presence of multiuser interference," *IEEE Transactions on Communications*, Vol. 57, No. 8, pp. 2369-2379, August 2009.
- J20. **T. Erseghe**, "A low-complexity receiver for Impulse Radio based upon a Gaussian mixture interference model," *IEEE Transactions on Wireless Communications*, Vol. 7, No. 12, pp. 4867-4876, December 2008.
- J21. **T. Erseghe**, V. Cellini, G. Donà, "On UWB Impulse Radio receivers derived by modeling MAI as a Gaussian mixture process," *IEEE Transactions on Wireless Communications*, Vol. 7, No. 6, pp. 2388-2396, June 2008.
- J22. **T. Erseghe**, G. Cariolaro, "Efficient DFT architectures based upon symmetries," *IEEE Transactions on Signal Processing*, Vol. 54, No. 10, pp. 3829-3838, October 2006.
- J23. (Invited) **T. Erseghe**, N. Laurenti, "Design and performance evaluation of a full-duplex operating receiver for time-hopping UWB," *ACM/Springer Journal on Mobile Networks and Applications (MONET)*, Special Issue on "Ultra wide band for sensor networks", Vol. 11, No. 4, pp. 429-439, August 2006.
- J24. **T. Erseghe**, "Capacity of UWB Impulse Radio with single-user reception in Gaussian noise and dense multipath," *IEEE Transactions on Communications*, Vol. 53, No. 8, pp. 1257-1262, August 2005.
- J25. **T. Erseghe**, N. Laurenti, V. Cellini, "A multicarrier architecture based upon the affine Fourier transform," *IEEE Transactions on Communications*, Vol. 53, No. 5, pp. 853-862, May 2005.
- J26. **T. Erseghe**, G. Cariolaro, "An orthonormal class of exact and simple DFT eigenvectors generated by the Theory of Symmetries," *IEEE Transactions on Signal Processing*, Vol. 51, No. 10, pp. 2527-2539, October 2003.
- J27. **T. Erseghe**, "Time-hopping patterns derived from permutation sequences for ultra-wide-band Impulse Radio applications," *WSEAS Transactions on Communications*, Vol. 1, No. 1, pp. 109-115, 2002.
- J28. G. Cariolaro, **T. Erseghe**, P. Kraniuskas, "The fractional discrete cosine transform," *IEEE Transactions on Signal Processing*, Vol. 50, No. 4, pp. 902-911, April 2002.
- J29. G. Cariolaro, **T. Erseghe**, L. Vangelista, "Exact spectral evaluation of the family of pulse interval modulated signals," *IEEE Transactions on Information Theory*, Vol. 47, No. 7, pp. 2983-2992, November 2001.
- J30. G. Cariolaro, **T. Erseghe**, P. Kraniuskas, N. Laurenti, "Multiplicity of fractional Fourier transforms and their relationships," *IEEE Transactions on Signal Processing*, Vol. 48, No. 1, pp. 227-241, January 2000.
- J31. **T. Erseghe**, P. Kraniuskas, G. Cariolaro, "Unified fractional Fourier transform and sampling theorem," *IEEE Transactions on Signal Processing*, Vol. 47, No. 12, pp. 3419-3423, December 1999.
- J32. G. Cariolaro, **T. Erseghe**, P. Kraniuskas, N. Laurenti, "A unified framework for the fractional Fourier transform," *IEEE Transactions on Signal Processing*, Vol. 46, No. 12, pp. 3206-3219, December 1998.
- J33. P. Kraniuskas, G. Cariolaro, **T. Erseghe**, "Method for defining a class of fractional operations," *IEEE Transactions on Signal Processing*, Vol. 46, No. 10, pp. 2804-2807, October 1998.

International conference papers

- C1. **T. Erseghe**, "A distributed algorithm for fast optimal power flow regulation in smart grids," *IEEE SmartGridComm 2014*, pp. 31-36, Venice, Italy, 3-6 November, 2014.
- C2. S. Tomasin, **T. Erseghe**, R. Pollis, "Co-simulation of control for thermal and electrical smart micro grids on a PLC-based testbed," *IEEE International Energy Conference*, Dubrovnik, Croatia, 13-16 May, 2014.
- C3. C. Codemo, **T. Erseghe**, A. Zanella, "Energy storage optimization strategies for smart grids," *IEEE ICC 2013*, pp. 4089 - 4093, Budapest, Hungary, 9-13 June, 2013.
- C4. **T. Erseghe**, S. Tomasin, "Plug and Play Topology Estimation via Powerline Communications for Smart Micro Grids," *WSPLC 2012*, Rome, Italy, September 20-21, 2012.
- C5. M. Gallina, M. Tasca, **T. Erseghe**, S. Tomasin, "Microgrid control via powerline communications: network synchronization field tests with prime modules," *IEEE ENERGYCON 2012*, Florence, Italy, September 9-12, 2012.
- C6. F. Trentini, M. Tasca, S. Tomasin, **T. Erseghe**, "Reactive power compensation in smart micro grids: a PRIME-based testbed," *IEEE ENERGYCON 2012*, Florence, Italy, September 9-12, 2012.
- C7. A. Costabeber, P. Tenti, **T. Erseghe**, S. Tomasin, P. Mattavelli, "Distributed control of smart microgrids by dynamic grid mapping," *IEEE IECON 2011*, Melbourne, Australia, November 7-10, 2011.
- C8. **T. Erseghe**, F. Lorenzon, S. Tomasin, A. Costabeber, P. Tenti, "Distance Measurement over PLC for Dynamic Grid Mapping of Smart Micro Grids," *IEEE SmartGridComm 2011*, pp. 487-492, Brussels, Belgium, October 17-20, 2011.
- C9. A. Costabeber, **T. Erseghe**, P. Tenti, S. Tomasin, "Optimization of micro-grid operation by dynamic grid mapping and token ring control," *Proceedings of the 14th European Conference on Power Electronics and Applications*, EPE 2011, Birmingham, UK, 30 August–1 September, 2011.
- C10. A. Costabeber, **T. Erseghe**, P. Tenti, S. Tomasin, "Optimum control of distributed energy resources in residential micro-grids," *IEEE PowerTech 2011*, Trondheim, D, 19-23 June, 2011.
- C11. D. Zennaro, E. Dall'Anese, **T. Erseghe**, L. Vangelista, "Fast Clock Synchronization in Wireless Sensor Networks via ADMM-based Consensus," *IEEE WiOpt 2011*, Princeton, New Jersey, USA, May 9-13, 2011.
- C12. S. Tomasin, **T. Erseghe**, "Constrained optimization of local sources in Smart Grids by SDP approximation," *IEEE ISPLC 2011*, Udine, Italy, April 3-6, 2011.
- C13. D. Forner, **T. Erseghe**, S. Tomasin, P. Tenti, "On efficient use of local sources in smart grids with power quality constraints," *IEEE SmartGridComm 2010*, Gaithersburg, Maryland, USA, October 4-6, 2010.
- C14. D. Painaitopol, J. Fiorina, **T. Erseghe**, "A comparison of IR-UWB receivers adapted to MUI with mixture based distributions," *IEEE WCNC 2010*, Sydney, Australia, April 18-21, 2010.
- C15. A.M. Cipriano, J. Gasnier, **T. Erseghe**, "Interference control in time-windowed OFDM systems with realistic power amplifiers," *IEEE 17th International Conference on Software, Telecommunications & Computer Networks (SoftCOM 2009)*, Hvar, Croatia, p. 181-185, September 24-26, 2009.
- C16. **T. Erseghe**, F. Renna, "On Schmidl-Cox-like frequency estimation applied to UWB impulse radio systems," *IEEE International Conference on Ultra-Wideband (ICUWB 2009)*, Vancouver, Canada, pp. 693-697, September 9-11, 2009.
- C17. F. Renna, N. Laurenti, **T. Erseghe**, "Time synchronization for OFDM systems in very dispersive channels," *IEEE International Conference on Ultra-Wideband (ICUWB 2009)*, Vancouver, Canada, pp. 545-550, September 9-11, 2009.
- C18. **T. Erseghe**, A. Cipriano, "Performance of UWB Impulse Radio in strong MAI with frequency offsets estimation," *IEEE International Conference on Ultra-Wideband (ICUWB 2008)*, Vol. 1, pp. 213-216, Hannover, Germany, September 10-12, 2008.
- C19. **T. Erseghe**, S. Tomasin, "Optimized demodulation for MAI resilient UWB W-PAN receivers," *ICC 2008*, Beijing, China, May 19-23, 2008.
- C20. **T. Erseghe**, N. Laurenti, V. Rizzi, R. Corvaja, "A packet detection algorithm for the UWB standard ECMA 368," *Tyrrhenian Workshop on Wireless Digital Communications 2007 (TIWDC 07)*, Ischia, Naples, Italy, September 10-12, 2007.
- C21. **T. Erseghe**, "A low-complexity Impulse Radio receiver based upon Gaussian mixtures," *ICC 2007*, Glasgow, Scotland (UK), pp. 4311-4316, June 24-28, 2007.
- C22. **T. Erseghe**, V. Cellini, G. Donà, "UWB Impulse Radio receivers derived from a Gaussian mixture interference model," *ICC 2007*, Glasgow, Scotland (UK), pp. 5757-5762, June 24-28, 2007.

- C23. D. Menon, S. Andriani, G. Calvagno, **T. Erseghe**, "On the dependency between compression and demosaicing in digital cinema," *CVMP 2005*, London (UK), November 30-December 1, 2005.
- C24. **T. Erseghe**, N. Laurenti, "Time hopping UWB: receiver design and performance of a full-duplex system," *IEEE 2nd International Workshop 'Networking with Ultra Wide Band' (NEUWB2)*, Rome, Italy, July 4-6, 2005.
- C25. S. Andriani, G. Calvagno, **T. Erseghe**, G.A. Mian, M. Durigon, R. Rinaldo, M. Knee, P. Walland, M. Koppetz, "Comparison of lossy to lossless compression techniques for digital cinema," *ICIP 2004*, Singapore, October 24-27, 2004.
- C26. **T. Erseghe**, N. Laurenti, P. Nicoletti, A. Sivieri, "An algorithm for radio resource management in UWB ad-hoc networks with concurrent guaranteed QoS and best effort traffic," *WPMC 2004*, Abano Terme, Italy, Vol. 3, pp. 440-444, September 12-15, 2004.
- C27. **T. Erseghe**, "Time-hopping sequences selection in UWB-Impulse-Radio packet networks," *WPMC 2004*, Abano Terme, Italy, Vol. 1, pp. 29-33, September 12-15, 2004.
- C28. N. Laurenti, **T. Erseghe**, V. Cellini, "On the performance of TH-PPM and TH-PAM as transmission formats for UWB communications," *VTC-Spring 2004*, Milan, Italy, May 17-19, 2004.
- C29. P.W. Walland, G. Thomas, M. Koppetz, J. Cardoso, **T. Erseghe**, F. Hericourt, "The application of intimate metadata in post-production," *International Broadcasting Convention, IBC 2002*, Amsterdam RAI, September 13-17, 2002.
- C30. **T. Erseghe**, N. Bramante, "Pseudo chaotic encoding applied to ultra wide band Impulse Radio," *IEEE VTC-Fall 2002*, Vancouver, Canada, Vol. 3, pp. 1711-1715, September 24-28, 2002.
- C31. **T. Erseghe**, "Time-hopping patterns derived from permutation sequences for ultra-wide-band Impulse Radio applications," *6th WSEAS International Conference on Communications (WSEAS 2002)*, Rethymna Beach, Rethymnon, Crete, pp. 109-115, July 7-14, 2002.
- C32. G. Cariolaro, **T. Erseghe**, L. Vangelista, "Stationary model of pulse interval modulation and exact spectral evaluation," *IEEE ICC 2000*, New Orleans, Louisiana, USA, pp. 660-664, June 18-22, 2000.

International patents

- P1. M. Weston, **T. Erseghe**, T. Vlachos, M. Price, J.H. Chenot, L. Laborelli, P. van Roosmalen, A. Kokkaram, "Moving image restoration [AURORA architecture]," *Patent No. PCT/GB99/00180*, January 20, 1999.

Theses

- T1. **T. Erseghe**, "Ultra wide band pulse communications," *PhD dissertation thesis*, Università degli Studi di Padova, February 1, 2002.
- T2. **T. Erseghe**, "Trasformazioni di Fourier frazionarie," *Laurea degree thesis (in italian)*, Università degli Studi di Padova, November 5, 1996.

Published teaching material

- Tm1. N. Benvenuto, R. Corvaja, **T. Erseghe**, S. Tomasin, *Fondamenti di comunicazioni: Testi di esame con soluzioni*, (in italian), ISBN-9788877842756, Libreria Internazionale Cortina, Padova: 2007. (Ed. II, 2008, Ed. III, 2009)
- Tm2. **T. Erseghe**, "Appunti di Trasmissioni Numeriche: vol I," (in italian), Padova: Copisteria Portello, 2005. (Ed. II, 2007)
- Tm3. N. Benvenuto, G. Cortelazzo, R. Corvaja, **T. Erseghe**, R. Rinaldo, "Principi di Modulazione Analogica ed Esercizi di Sistemi di Comunicazione," (in italian), Padova: Edizioni Progetto, 2003. (Ed. II, 2004; Ed. III, 2005, Ed. IV, 2006)

SIGNIFICANT RESEARCH ACHIEVEMENTS

Coding in the finite blocklength regime

Coding bounds in the finite blocklength regime have recently become quite popular for their ability to capture a compact (and meaningful) description of the physical layer to be used, e.g., for upper layers optimization. These bounds date back to the work of Shannon, Gallager, and Berlekamp (1967), and have received new interest now that powerful coding and decoding techniques that reach the limits of reliable communications are commonly used. In this respect, the aim of the research is to improve existing bounds, or to propose new bounds for the scenarios not covered by the state-of-the-art literature. The main contributions are:

1. A general method that uses Laplace integrals, as well as their asymptotic approximation for large codeword length n , was proposed in [J3] to evaluate the bound recently proposed by Polyansky, Poor, and Verdu in an AWGN context. The idea has been generalized in [J2] to obtain achievability and converse bounds for a number of channels including parallel AWGN channels, the BSC, and the BI-AWGN channel.
2. A tight bound that significantly outperforms the stat-of-the-art has been identified in the BI-AWGN case. The new bound clearly shows that current demodulation through message-passing is 1 dB suboptimal [J2].
3. A matlab code that implements the BI-AWGN bound has been made available in SPECTRE (short packet communication toolbox), a MIT project led by Prof. Y. Polyanskiy (see <http://github.com/yp-mit/spectre>).

Distributed processing

The aim of the research is to identify methodologies to solve a minimization problem in a fully decentralized way, that is, in such a way that only local parameters exchanges between neighbor nodes or neighbor regions are allowed. Evidently, the problem at hand needs to be a networked kind of problem, where variables of interest have some (local) dependency with neighbor regions/nodes parameters. The kind of application scenarios is vast, ranging from the electrical world (optimal power flow like problems), localization problems in wireless sensor network scenarios, maximum likelihood decoding procedures, etc. The research has concentrated on the use of a technique called **alternating direction method of multipliers (ADMM)** which has become quite popular in recent years, and which has been suitably adapted to convex as well as non convex scenarios. The main contributions are:

1. A fast distributed consensus algorithm (i.e., distributed evaluation of the mean value of local measurements) based upon ADMM has been studied in [J14], and has been proved to possess improved resilience to noise. The approach was used in [C11] for distributed synchronization in a sensor network.
2. A general method to adapt ADMM to complex networked problems, either convex or non convex, has been presented in [J12].
3. The optimal power flow (OPF) problem of optimally setting electrical parameters in a power grid has been addressed in [J6], [C1]. The algorithm exploits the method in 2 and adapts it to the particularly harsh and non-convex OPF environment. A stronger result with a convergence guarantee and applicability to larger networks is available in [J5].

4. A method for distributed sensor network localization has been proposed in [J4] and refined in [J1]. The method is proved to converge, irrespective of the exact that localization is an highly non-linear problem, and it is also shown to be reliable under harsh non-Gaussian scenarios.

Smart micro grids

With the objective of increasing the reliability and the efficiency of power distribution, smart micro grids (SMGs) have emerged as a promising paradigm to integrate electrical, control and communication technologies. A SMG corresponds to the customer domain of the IEEE P2030 Standard and it comprises both local sources (e.g., photovoltaic panels, micro turbines, and wind generators), and local loads (e.g., houses, offices, and factories). Usually, SMGs are connected to the main power utility, with which energy is exchanged at given prices. Current and future SMG will also comprise storage devices, such as batteries and electric vehicles. Contrary to conventional grids where power was generated in a few controlled places, the new scenario includes a large number of local generators, and a (potentially) high variability of provided power due to both fluctuations of the generation process itself (e.g., weather effects on photovoltaic panels) and local policies to sell or buy energy following the changing costs and revenues.

SMG optimization requires accurate control of the grid, and a suitable supporting communication and monitoring infrastructure. In this scenario one of the aims of the research is **cross-fertilization** from and to the telecommunication world. The following activities related to both **communications** and **signal processing** worlds have been conducted:

1. Power flow optimization (OPF) has been investigated in [J11] by proposing an efficient centralized solution based upon semi definite programming (SDP) methods, a technique that has recently gained a lot of interest in the signal processing community.
2. A fully distributed solution to the non convex OPF problem was proposed in [J6] by exploiting the ADMM approach. The solution has been refined in [C1] to obtain a reliable and fast algorithm. A stronger result with a convergence guarantee and applicability to larger networks is available in [J5].
3. Powerline communication (PLC) modules equipped with ranging capabilities are exploited in [J10] to obtain a reliable, plug-and-play, distributed network topology estimation to be used for SMG optimization purposes.
4. Optimal management of local energy storage (batteries) has been approached in [J7], [J9] by use of a dynamic programming (DP) approach suitably modified to obtain low complexity optimal policies. A method to quasi-optimally manage multiple batteries has also been identified.

Ultra wide band communications

UWB communication techniques use a very wide frequency range going from 3.1 to 10.7 GHz, and also cover a 500 MHz bandwidth on television broadcasting frequencies around 800 MHz. They are intended as low power, low emission, and low complexity communications that have the potential to coexist with narrow band legacy communication systems. The technological and scientific challenge with UWB is the design of high performance but low complexity receivers. There exist two main approaches to UWB: a high rate approach based upon orthogonal frequency division multiplexing (OFDM) which has been standardized in ECMA 386 (see also IEEE 802.15.3a), and a low rate approach based upon time hopping (TH) which has been standardized in IEEE 802.15.4a. Both approaches have been considered in this research.

TH-UWB This communication technique, also known as Impulse Radio, is characterized by transmission of very short impulses, and by very low duty cycles. Differently from standard modulations (e.g., direct sequence) the TH access suffers from severe impulsive interferences which call for an elaborate receiver design. In fact, the classical additive white Gaussian noise (AWGN) receiver is known to easily fail. The **methodology** followed in this research is a **top-down approach** where complex techniques have been first identified to assess optimal performance and get deeper insights on the problem. Then, low complexity alternatives that closely follow the optimal bound have been found. Specifically:

1. A high performance maximum likelihood (ML) receiver design based on a Gaussian mixture (GM) model for multiple access interference (MAI) is presented in [J21], and methods for low complexity implementation are given in [J20].
2. A generalization to more complex generalized GMs is presented in [J19] where a very simple but high performance receiver based on a Laplacian model for MAI was identified. This set the state-of-the-art.
3. A ML frequency offset estimator, with the further capability of being robust to MAI, was proposed in [J15], and a low-complexity alternative based upon the Schmidl-Cox principle, carefully adapted to the TH access, was proposed in [J13]. This included a general methodology for providing a 0.75 dB improvement to Schmidl-Cox frequency offset estimation (0.5 dB from the Cramer-Rao bound) at absolutely no complexity cost.

Other meaningful aspects that have been covered by the research are:

1. Time hopping codes constructions were addressed in [J27] by use of Galois fields properties.
2. A methodology to design low-complexity UWB-IR receivers operating in full-duplex mode was discussed in [J23].
3. The capacity of UWB-IR systems in dependence of the chosen PPM format were discussed in [J24].

OFDM-UWB Being OFDM techniques well assessed, the research in this field has focused on novel aspects related to the use of a frequency hopping (FH) access. Specifically, both packet detection and time synchronization aspects have been addressed, with the following main outcomes:

1. Fast packet detection techniques in presence of a FH access are analyzed in [J18]. As a side result of this research a closed-form expression for Schmidl-Cox packet detection was found in [J17].
2. Optimum temporal synchronization in the presence of long dispersive channel is studied in [C17].

Fractional Fourier transforms

The FrFT was introduced in 1980 by Namias, and is a continuous transform connected to propagation in fiber optics and to optical systems in general. In the 90's, the FrFT has then been recognized as a useful tool for signal processing. The aspects that have been considered during this research belong to two main areas, namely: the discrete version of Namias FrFT, and the multiplicity of FrFT definitions.

With respect to FrFT discretization, the following results have been achieved:

1. The FrFT was casted into a framework with an inner Fourier transform (FT) core and chirp multiplications. This allows for a very general definition of FrFT operators [J33].
2. The above result was used to derive a FrFT sampling theorem where the role of periodicity (typical of the FT world) was replaced by that of chirp-periodicity [J31].

3. Application of the FrFT sampling theorem to the OFDM world provided a modulation format which is optimal for a specific class of time-varying channels, which can be typically encountered in satellite or aircraft communications [J25].

With respect to FrFT multiplicity, the following results have been achieved:

1. The study of FrFT multiplicity using a unifying approach to stress inner relations was given in [J30], [J32].
2. The definition of a fractional discrete Fourier transform (DFT) calls for the identification of a closed-form DFT orthogonal basis made of DFT eigenvectors. This basis was identified by means of *symmetries* in [J26], and the related fractional DFT was shown to have an efficient implementation (FFT like) in [J22].
3. Fractional discrete cosine transforms (DCTs) were proposed in [J28].

Spectral analysis of complex modulation formats

The long going expertise of the telecommunication group of Padova about spectral analysis was applied during the years to a number of complex or new modulation formats. The difficulty, and the specificity, of the chosen methodological approach is to obtain *closed-form expressions*, as opposed to the use of numerical methods.

The most significant results achieved are:

1. Study of pulse interval modulation (PIM) spectral analysis was conducted in closed form in [J29] by use of the theory of variable length codes.
2. Study of multi- h continuous phase modulation (CPM) formats was conducted in [J16] by use of the theory of finite state machines. A novel closed form expression providing very simple computational complexity was found.

PUBLICLY FUNDED PROJECTS

MORE GOSSIP 2016-2019 30 months	More GNSS Open Service Signal Integrity Protection and Authentication at the Physical Layer <i>Funded by the European Space Agency (ESA)</i> Collaborator and internal WP leader for channel coding issues related to European GNSS (Galileo).
2010-2011 24 months	Algorithm development for a universal trans-modulation system for DVB-S and DVB-T signals <i>Funded by Veneto Region (Italy) under the L.R. 9 Fund</i> Leader for the Unit of Padova in a project led by Mitan srl.
SMART 2009-2011 24 months	Design and implementation of a novel control and communication architecture for cooperative operation of distributed harmonic and reactive compensators <i>Funded by University of Padova</i> Collaborator in a multidisciplinary Smart Grid project led by Prof. Paolo Tenti
UWB-IR 2007-2009 24 months	Efficient receivers for UWB Impulse Radio in WLAN scenarios with multiple user access <i>Funded by University of Padova</i> Project leader in a focused local UWB project
2006-2008 24 months	Enabling blocks for the integration in CMOS technology of a Multi-Band OFDM “Ultra Wide Band” transceiver <i>Funded by the Fund for Projects of Relevant National Interest (PRIN)</i> Collaborator in a multidisciplinary UWB project led by Prof. Rinaldo Castello, University of Pavia, Italy
NEWCOM 2004-2007 36 months	Network of Excellence in Wireless COMMunications <i>IST Project No. FP6-IST-2003-507325</i> Senior researcher in a FP6 NoE led by Prof. Sergio Benedetto, Polytechnic of Turin, Italy
PRIMO 2003-2006 36 months	Reconfigurable Platforms for Wideband Wireless Communications <i>Funded by the National Fund for Investments on Basic Research (FIRB)</i> Senior researcher
MetaCamera 2004-2005 12 months	Investigate and implement the real-time handling of wide bandwidth picture content from the high resolution, high frame rate cameras that will be demanded for future D- and E-cinema applications <i>IST Project No. FP6-IST-2003-506969</i> Senior researcher and local coordinator for a FP6 project led by Snell&Wilcox, GB
MetaVision 2001-2003 36 months	Define, create and demonstrate a Universal Electronic Production system capable of meeting the demands of both the Film and Television Industries <i>IST Project No. FP5-IST-1999-20859</i> Senior researcher and local coordinator for a FP5 project led by Snell&Wilcox, GB
PIM 2000 12 months	Pulse Interval Modulation for ultra wideband RF transmission <i>Funded by the Research Projects National Fund for Young Researchers</i> Project leader

AURORA

1997-1999

36 months

AUtomated Restoration of ORiginal film and video Archives

Funded by the EU Commission – ACTS Project No. AC072

R&D researcher at Snell&Wilcox on image unsteadiness and flicker removal in a EU project led by Institut National de l'Audiovisuel (INA), France

TEACHING EXPERIENCE

Students evaluation

Course	Academic Year	Overall satisfaction	Quality of teaching	Quality of organization
Segnali e sistemi	16/17	74.9%	76.0%	77.8%
Channel coding	16/17	85.6%	95.0%	91.1%
Channel coding	15/16	90.0%	90.9%	94.3%
Channel coding	14/15	87.8%	89.4%	89.7%
Channel coding	13/14	82.5%	80.7%	86.1%
Segnali e sistemi	09/10	80.3%	85.9%	77.4%
Segnali e sistemi	08/09	80.0%	87.0%	80.9%

List of the courses taught

- ✓ **Network science**, given in English, for graduate students, 3 ECTS credit module – Academic year 2017/2018

Topics: Ranking - Hubs and authorities; PageRank: teleportation, topic specific ranking, proximity measures, trust rank; Speeding up by quadratic interpolation. Community detection - Dendrograms; Girvan Newman method and betweenness; Modularity optimization; Spectral clustering; Other clustering algorithms; Core-periphery model for overlapping communities; Clique percolation method; Cluster affiliation model and BixCLAM. Link prediction.

- ✓ **Segnali e sistemi** (Signals and systems), given in Italian, for undergraduate students, 9 ECTS credits – Academic years 2004/2005, 2005/2006, 2006/2007, 2007/2008, 2008/2009, 2009/2010, 2016/2017, 2017/2018

Topics: Signals in the time domain: continuous, discrete, periodic; Systems in the time domain: linear time invariant systems and convolution; Fourier series; the Fourier transform; Fourier transform for discrete time signals; Shannon's sampling theorem; Laplace transform and its use for the solution of differential equations; the Z transform and its use for the solution to differential equations.

- ✓ **Channel coding**, given in **English**, for graduate students, 6 ECTS credits – Academic year 2017/2018

Topics: The encoder/channel/decoder system model; A brief history of coding; Linear codes; Convolutional, turbo, LDPC, and BICM codes; Graphical representation of codes; Message passing; the BCJR algorithm; belief propagation decoding of LDPC and turbo codes; LDPC codes performance evaluation; BICM decoding; Shannon's theorem on channel capacity; proof of the theorem and of its converse; capacity of a Gaussian channel, of waveform channels, of the BSC; capacity for a specific constellation; waterfilling; bounds in the finite-block-length regime.

- ✓ **Channel coding**, given in **English**, for graduate students, 9 ECTS credits – Academic years 2013/2014, 2014/2015, 2015/2016, 2016/2017
Topics: see “Channel coding”.

- ✓ **Smart grids**, given in Italian, for graduate students, 1 ECTS credit module – Academic years 2013/2014, 2014/2015
Topics: Communication requirements of the smart grid; Introduction to communications: narrowband and wideband transmission; multicarrier modulations and OFDM; An overview on wired and wireless communication standards: ZigBee, WiMAX, UMTS, ADSL, powerline communications; An overview of the PRIME standard; Lab experience with PRIME modules.

- ✓ **Channel codes and capacity**, given in **English**, for graduate students, 6 ECTS credits – Academic years 2011/2012, 2012/2013
Topics: see “Channel coding”.

- ✓ **Trasmissione numerica** (Digital communications), given in Italian, for graduate students, 3 ECTS credits module – Academic years 2004/2005, 2005/2006, 2006/2007
Topics: baseband equivalent model of a communication system at discrete times; channel models; multipath models; spread spectrum communications: direct sequence, time hopping, frequency hopping; optimum decoder approach under channel dispersion and the Viterbi algorithm.

- ✓ **Introduzione alla Teoria dei Segnali ed alle sue applicazioni** (Introduction to signal theory and its applications), given in Italian, for Ph.D. students, 4 lectures – Academic year 2004/2005
Topics: Signals in the time domain: continuous, discrete, periodic; Fourier transforms for continuous and discrete signals; sampling, interpolation, periodic repetition and de-periodization operators; the FFT and its applications; filter design.

- ✓ **Fondamenti di comunicazioni** (Communication systems fundamentals), given in Italian, for undergraduate students, 6 ECTS credits – Academic years 2002/2003, 2003/2004
Topics: analog modulations: double side band, single side band, vestigial side band, amplitude modulation, frequency and phase modulations; digital modulation approaches: QAM, PAM, PPM, PSK; PCM transmission; link budget; an overview on communication media.

PROFESSIONAL ACHIEVEMENTS (miscellaneous)

Italian professor Qualification

- ✓ *ASN, abilitazione scientifica nazionale*
Qualification to associate professorship
Received on 14/01/2015
Valid until 14/01/2021

Educational committees activity

- ✓ Degree Program Board (**Commissione Didattica**) Member for the Graduate Laurea Degree on Telecommunication Engineering, University of Padova – academic years 2004/2005, 2005/2006, 2006/2007, 2007/2008, 2008/2009, 2016/2017
- ✓ Degree Program Board (**Commissione Didattica**) Member for the Undergraduate Laurea Degree on Information Engineering, University of Padova – academic years 2009/2010, 2010/2011, 2011/2012
- ✓ Web Committee (**Commissione Web**) Member at the Department of Information Engineering, University of Padova – academic year 2006/2007

Other committees

- ✓ Member of the Research Board (**Commissione Ricerca**) at Dipartimento di Ingegneria dell'Informazione, University of Padova, years 2015, 2016
- ✓ Representative for the University of Padova at the Scientific Council (**Consiglio Scientifico**) of CNIT (Consorzio Nazionale Italiano Telecomunicazioni), years 2011-2013

Technical program committee activity

- ✓ Program Committee Member at 6th WorkShop on Power Line Communications (WSPLC12), Rome, Italy, 20-21 September, 2012
- ✓ Publications Chair at Tyrrhenian Workshop on Wireless Digital Communications 2007 (TIWDC 07), Ischia, Naples, Italy, 10-12 September, 2007
- ✓ Local Arrangements Co-Chair at WPMC 2004, Abano Terme, Padova, Italy, 12-15 September 2004
- ✓ TPC member for:
 - IEEE CrownCom 2010
 - IEEE EnergyCon 2012
 - IEEE Globecom 2010, 2012, 2013, 2014, 2015, 2016, 2017, 2018
 - IEEE ICC 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018
 - IEEE I4CT 2015, 2016
 - IEEE ICCVE 2013, 2014
 - IEEE ICUWB 2010
 - ISWCS 2015, 2016
 - IEEE PIMRC 2008
 - IEEE SmartGridComm 2010, 2011
 - IEEE SPAWC 2017
 - IEEE WCNC 2009, 2011, 2012, 2014, 2015, 2016

- IEEE WCSP 2012, 2013
- SMARTGREENS 2013

✓ Technical Committee Member at the Summer School on Information Engineering (years 2002, 2003, 2004, 2005), organized by the University of Padova

Journal editorial activity

✓ Editorial Board Member of ISRN Journal on Communication and Networking, Hindawi Publishing Corporation (2010-2013)

✓ Reviewer for many international Transactions/Journals, including:

- Elsevier - Signal Processing
- EURASIP Journal on Wireless Communications and Networking
- IEEE Communication Letters
- IEEE Signal Processing Letters
- IEEE Transactions on Automatic Control
- IEEE Transactions on Circuits and Systems-I and II
- IEEE Transactions on Communications
- IEEE Transactions on Power Systems
- IEEE Transactions on Signal Processing
- IEEE Transactions on Smart Grid
- IEEE Transactions on Vehicular Technology
- IEEE Transactions on Wireless Communications
- IEICE Transactions - Special Issue on Ultra Wideband Systems
- SIAM Journal for Scientific Computing
- SPIE Journal of Electronic Imaging

Participation to relevant open-source projects

✓ SPECTRE (short packet communication toolbox), a MIT project led by Prof. Y. Polyanskiy (see <http://github.com/yp-mit/spectre>)

SUPERVISING ACTIVITY

2017

Matteo Zecchin, "Numerical evaluation of coding bounds in the finite-blocklength regime," (undergraduate laurea thesis), July 2017

Marco Ceccon, "Graph signal processing: reconstruction algorithms," (graduate laurea thesis), February 2017

2016

Simone de Vecchi, "Decodifica di codici LDPC con programmazione lineare," (undergraduate laurea thesis), July 2016

Nicola Piovesan, "Distributed algorithms for localization in wireless sensor networks," (graduate laurea thesis), April 2016

2015

Riccardo Gasparetto Stori, "Smart charging scheduling for plug-in electric vehicles," (graduate laurea thesis), October 2015

2014

Giacomo Da Broi, "Performance evaluation of DVB-S2X over satellite channels," (graduate laurea thesis), December 2014

Valentina Giroto, "Joint optimization of energy and data buffers in WSNs," (graduate laurea thesis), October 2014

Gianluca Guerra, "L'Algoritmo di Viterbi e sue applicazioni," (undergraduate laurea thesis), September 2014

Gianluca Agresti, "L'Algoritmo di Viterbi: analisi e simulazione," (undergraduate laurea thesis), July 2014

Matteo Dalla Rosa, "Progettazione e sviluppo di un software di comunicazione seriale con modem PLC per applicazioni smart grid," (undergraduate laurea thesis), March 2014

2013

Tommaso Martini, "Reed-Solomon codes," (undergraduate laurea thesis), July 2013

Davide Merzi, "Progettazione e configurazione di una rete LAN aziendale," (undergraduate laurea thesis), July 2013

Riccardo Pollis, "Decodifica di codici LPDC con tecniche di programmazione lineare," (graduate laurea thesis), April 2013

2012

Alessandro Biral, "Ottimizzazione nelle smart grid: soluzione centralizzata e distribuita," (graduate laurea thesis), December 2012

Claudio Codemo, "Ottimizzazione dell'energy storage per applicazioni smart grid," (graduate laurea thesis), October 2012

Paolo Conte, "Sviluppo e implementazione di uno stack protocollare per smart grid," (graduate laurea thesis), October 2012

Lorenzo Meneguz, "Analisi delle specifiche di base di un interruttore crepuscolare, progettazione e realizzazione HW e FW di un prototipo gestito tramite microcontrollore," (undergraduate laurea thesis), July 2012

Michele Tasca, "Power line communications per smart grids: studio e test su rete artificiale," (graduate laurea thesis), April 2012

Massimo Gallina, "Sincronizzazione tra dispositivi su power line communications per smart grid," (graduate laurea thesis), April 2012

Marco Migliorini, "Smart grid: sistemi di controllo, sistemi di sicurezza e mercato dell'energia," (graduate laurea thesis), April 2012

Francesco Trentini, "Power line communications: an implementation of a real-time control architecture for smart-grid," (graduate laurea thesis, co-supervisor), April 2012

Andrea Vico, "Localizzazione tramite UWB," (undergraduate laurea thesis), February 2012

Pietro Danzi, "Smart grid e PLC: TOA ranging," (undergraduate laurea thesis), February 2012

2011

Paolo Rossignoli, "Ranging per smart grid," (undergraduate laurea thesis), November 2011

Simone Salvaro, "Misure di ranging per smart grid," (undergraduate laurea thesis), September 2011

Roberto Francescon, "Protocolli powerline communications per applicazioni smart grid," (undergraduate laurea thesis), September 2011

Stefano Fie, "Metodi di ottimizzazione vincolata per smart grids," (graduate laurea thesis), July 2011

Francesco Lorenzon, "Tecniche di ranging su sistemi wireless UWB e wired PLC," (graduate laurea thesis), July 2011

Alberto Gambarucci, "Sviluppo ed utilizzo di GNU/Linux nei sistemi embedded," (undergraduate laurea thesis), July 2011

Giovanni Vadalà, "Sviluppo di algoritmi per un sistema standard di transmodulazione universale per segnali di tipo DVB terrestre e satellitare," (post-doc grant), August 2010-March 2011

2010

Mariano di Noia, "Algoritmi di localizzazione in sistemi UWB," (undergraduate laurea thesis), September 2010

Lorenzo Cappellari, "Sviluppo di algoritmi per un sistema standard di transmodulazione universale per segnali di tipo DVB terrestre e satellitare," (post-doc grant), April-July 2010

Andrea De Lazzari, "Modelli per la caratterizzazione del canale powerline," (undergraduate laurea thesis), February 2010

2009

Filippo Nicoletti, "Codifica e decodifica di un codice a barre Datamatrix ECC200," (undergraduate laurea thesis), November 2009

Nicola Anselmi, "Analisi per l'implementazione digitale di un ricevitore UWB," (undergraduate laurea thesis), November 2009

Nicolò Michelusi, "Semi-blind channel estimation for LTE downlink," (graduate laurea thesis), July 2009

Giuliano Leoni, "Localizzazione cooperativa mediante time of arrival in IEEE 802.15.4A," (graduate laurea thesis), April 2009

Francesco Lorenzon, "Sviluppo su FPGA di un algoritmo di ricezione per sistemi UWB," (undergraduate laurea thesis), February 2009

2008

Davide Bacco, "Analisi ed elaborazione di flussi DVB," (undergraduate laurea thesis), November 2008

Enrico Ballarin, "Analisi ed elaborazione di flussi DVB," (undergraduate laurea thesis), November 2008

Sebastiano Zaniol, "Applicazioni per la gestione del ciclo di vita del software in sistemi Z/OS," (graduate laurea thesis), October 2008

Marco Pengo, "TETRA: studio dello standard, analisi di radiocopertura e di un progetto esecutivo," (graduate laurea thesis), July 2008

Lobba Marco, "Progetto di un interfaccia per il protocollo ECMA 369," (graduate laurea thesis), July 2008

2007

Diego Mastrotto, "Progettazione e sviluppo modulo di acquisizione dati con gestione remota attraverso le reti GSM, GPRS e GPS," (graduate laurea thesis), September 2007

Luca Canzian, "Single acknowledgement system for Bluetooth multicast," (graduate laurea thesis), July 2007

Manuel Cecchinato, "Enhanced demodulation for EDR Bluetooth systems," (graduate laurea thesis), July 2007

Mattia Battistello, "Implementazione di un demultiplexer di transport stream MPEG2 per la distribuzione di servizi DVB-IP," (graduate laurea thesis), June 2007

Luca Cenzato, "Implementazione FPGA di un modulatore ECMA 368," (graduate laurea thesis), March 2007

Matteo Curto, "Realizzazione di un sistema di demultiplexing di un transport stream MPEG2 per la distribuzione su rete IP (DVB-IP)," (graduate laurea thesis), February 2007

Dario Locci, "Sviluppo su FPGA di un filtro di canale a banda variabile per il DVB," (graduate laurea thesis), February 2007

2006

Luca Bulegato, "Sviluppo e analisi di un sistema per la gestione di una flotta di autoveicoli: postazione mobile," (graduate laurea thesis), December 2006

Tommaso Baù, "Sviluppo e analisi di un sistema per la gestione di una flotta di autoveicoli: centrale operativa," (graduate laurea thesis), December 2006

Mosè Zago, "Sicurezza delle reti," (undergraduate laurea thesis), October 2006

Valentina Rizzi, "Packet detection and frame timing acquisition in UWB MB-OFDM systems," (graduate laurea thesis, co-supervisor), October 2006

Luca Aldegheri, "Progetto e sviluppo su FPGA di un modulatore ECMA 368," (graduate laurea thesis), October 2006

Giuliano Leoni, "Analisi dello standard ECMA-368 High Rate Ultra Wide Band," (undergraduate laurea thesis), July 2006

Marco Pain, "Tecniche di localizzazione per sistemi UWB," (undergraduate laurea thesis), July 2006

Tiziano Barbiero, "Analisi ed implementazione di un linearizzatore per laser a semiconduttore," (graduate laurea thesis), April 2006

Marco Boscardin, "Sviluppo di un sistema per lo streaming in real-time di servizi DVB su rete LAN," (graduate laurea thesis), April 2006

Alessandro Contarini, "Progetto di rete IP per la distribuzione locale di servizi DVB," (graduate laurea thesis), April 2006

Carlo Foscarini, "Progetto di un transcodificatore MPEG2 - H.264 a bassa complessità," (graduate laurea thesis), April 2006

Alessandro Scibilia, "Distribuzione di servizi DVB-IPI: analisi ed implementazione degli stadi di acquisizione e demultiplexing del Transport Stream," (graduate laurea thesis), April 2006

Tommaso Pepi, "Progetto e sviluppo su FPGA di un modulatore per sistemi multiband OFDM," (graduate laurea thesis), March 2006

2005

Luigi Iurlaro, "Realizzazione di un sistema client/server per lo streaming real time di servizi DVB," (undergraduate laurea thesis), November 2005

Marco Pengo, "IEEE 802.15.3, Il nuovo protocollo high-rate per le reti WLAN," (undergraduate laurea thesis), September 2005

Sebastiano Zaniol, "IEEE 802.15.4, Il nuovo protocollo low-rate per le reti WLAN," (undergraduate laurea thesis), September 2005

Matteo Silvestrin, "Implementazione e realizzazione di un compensatore per trasmissioni analogiche e digitali su fibra ottica," (graduate laurea thesis), May 2005

Carlo di Pietrantonio, "Implementazione su DSP del decodificatore H.264 (main profile) per broadcast TV," (undergraduate laurea thesis), April 2005

Francesco Pace, "Distribuzione di servizi tramite reti IP: implementazione dei protocolli RTP/RTCP su piattaforma ARM," (graduate laurea thesis), March 2005.

Pierluigi Budel, "Progetto di una piattaforma DVB-T per la consultazione remota," (graduate laurea thesis), March 2005.

Michele Da Rold, "Distribuzione di servizi DVB tramite reti IP: implementazione di una piattaforma Linux Embedded per l'incapsulamento," (graduate laurea thesis), March 2005.

Francesco Michelin, "Implementazione su FPGA dello stadio di modulazione per il DVB-C," (graduate laurea thesis), March 2005.

Walter Lancerin, "Riduzione delle distorsioni non lineari generate da un laser nella trasmissione analogica su fibra ottica: teoria ed implementazione," (graduate laurea thesis), February 2005.

2004

Andrea Francescato, "Analisi e implementazione di un compensatore per la trasmissione di segnali analogici e digitali su fibra ottica," (graduate laurea thesis), December 2004

Gabriele Siviero, "Studio e simulazione di un sistema di codifica H.264," (graduate laurea thesis), December 2004

Stefano Ranzato, "Stima ML del canale multipath in sistemi UWB impulse radio," (graduate laurea thesis), November 2004.

Michele Vicentini, "Codifica Inter con predizione del moto tramite standard H.264," (undergraduate laurea thesis), October 2004

Luca Bulegato, "Studio della modalità di codifica untraframe nel nuovo standard H.264/MPEG-4 AVC," (undergraduate laurea thesis), September 2004

Tommaso Baù, "Studio ed implementazione dello stadio DCT per H.264/MPEG-4 AVC," (undergraduate laurea thesis), September 2004

Marco Poletto, "Studio ed implementazione di un codificatore di Reed-Solomon per il DVB," (undergraduate laurea thesis), September 2004

Matteo Toscan, "Implementazione su FPGA dello stadio di pre-modulazione per il DVB," (graduate laurea thesis), July 2004

Federica Docali, "Un nuovo metodo di stima dicanale per sistemi UWB Impulse-Radio," (graduate laurea thesis), April 2004

Luca Maschietto, "Sviluppo ed implementazione di uno strato MAC per reti UWB ad-hoc," (graduate laurea thesis), April 2004

Filippo Pozzato, "Strategie MAC in reti UWB ad-hoc: analisi e simulazione," (graduate laurea thesis), April 2004

Pietro Nicoletti, "Tecniche di Power Control e loro applicazione in reti ad-hoc di tipo Ultra-Wide-Band," (graduate laurea thesis), February 2004

Andrea Sivieri, "Strategie di power control in reti ad-hoc di tipo ultra-wide-band: analisi e simulazioni," (graduate laurea thesis, co-supervisor), February 2004

2003

Bruno Bonomini, "Analisi e sviluppo di una piattaforma per l'incapsulamento e la trasmissione dei servizi DVB su IP," (graduate laurea thesis, co-supervisor), July 2003

Simone Carnielli, "Studio analitico/simulativo di acquisizione e tracking con criterio ML per trasmissioni UWB," (graduate laurea thesis, co-supervisor), April 2003

Luca Pilosio, "Realizzazione del modulatore QAM per DVB-C su piattaforma FPGA," (graduate laurea thesis, co-supervisor), April 2003

Sebastian Longo, "Analisi ed implementazione di un modulatore QAM secondo lo standard DVB-C," (graduate laurea thesis, co-supervisor), April 2003

Davide Cazzola, "Distribuzione di segnali multimediali su WLAN IEEE802.11b," (graduate laurea thesis, co-supervisor), March 2003

Enrico Perini, "Analisi della sincronizzazione per sistemi UWB attraverso il criterio di Maximum Likelihood," (graduate laurea thesis, co-supervisor), March 2003

2002

Claudio Popa, "Studio, implementazione e test di un incapsulatore DVB su IP per applicazioni Wireless LAN," (graduate laurea thesis, co-supervisor), December 2002

Matteo Tamiazzo, "Ottimizzazione delle strategie di rete nello standard DVB-Return Channel," (graduate laurea thesis, co-supervisor), July 2002

Antonio Piazza, "Analisi delle problematiche di coesistenza nelle reti Indoor Wireless LANs," (graduate laurea thesis, co-supervisor), June 2002

2001

Gabriele Donà, "Early-Late Tracking per sistemi UWB Impulse Radio," (graduate laurea thesis, co-supervisor), December 2001

Alessandro Ravagnin, "Modellizzazione dell'interferenza di intercanale nei sistemi Impulse Radio," (graduate laurea thesis, co-supervisor), December 2001

Nicola Bramante, "Applicazione di metodi di codifica caotica ai sistemi Impulse Radio," (graduate laurea thesis, co-supervisor), December 2001

Davide Prando, "A novel method for motion estimation using phase correlation," (graduate laurea thesis, co-supervisor), July 2001

2000

Demetrio Scarfone, "Cinema elettronico e sua distribuzione via satellite," (graduate laurea thesis, co-supervisor), December 2000

Giovanni Chierico, "Joint phase and timing recovery in a DVB satellite system," (graduate laurea thesis, co-supervisor), March 2000

Francesco De Pellegrini, "Acquisizione congiunta del sincronismo di tempo e frequenze per un sistema DVB su canale terrestre," (graduate laurea thesis, co-supervisor), March 2000

Luca Giacomini, "Recupero congiunto dell'offset residuo di frequenza di portante e dell'offset di campionamento per il sistema DVB su canale terrestre," (graduate laurea thesis, co-supervisor), March 2000

1999

Alex Siega, "Modellizzazione e recupero mediante PLL del rumore di fase in un sistema DVB satellitare," (graduate laurea thesis, co-supervisor), December 1999

Fabio Favaretto, "Recupero dell'offset di frequenza in un sistema DVB satellitare usando algoritmi AFC e PLL in serie," (graduate laurea thesis, co-supervisor), December 1999

Padova, April 20, 2018