Tomaso Erseghe

Associate Professor

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Short Bio: Tomaso Erseghe is an Associate Professor at the University of Padova, Italy, working on interdisciplinary topics covering network science and social network analysis, in collaboration with social psychologists from Padova and SWPS Warsaw.

He received the Laurea degree, *with honours*, and the Ph.D. degree in Telecommunication Engineering from the University of Padova, respectively in 1996 and 2002. From 1997 to 1999 he was with Snell & Wilcox R&D Department working on video standard conversion and video archive restoration. From 2002 and until 2017 he was an Assistant Professor at the University of Padova. His research interests have covered the fields of network science, social network analytics, distributed algorithms, the alternating direction method of multipliers, coding in the finite blocklength regime, 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 May 1, 2017
- ✓ Università degli Studi di Padova, Italy
  Assistant Professorship (*Ricercatore*)
  From Dec. 20, 2002 to April 30, 2017

Work experience in industry

- ✓ Snell & Wilcox ltd, UK
  R&D researcher from Jan. 1, 1997 to Apr. 30, 1999
  Working on video standard conversion and video archive restoration

Education

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

PUBLICATIONS

(h-index: Scopus 21, WoS 17, Google Scholar 28)

Submitted/in preparation

S1. M. Witkowska, M. Beneda, M. Formanowicz, M. Leszko, S. Arslan, J. Nikadon, J. Kowalski, **T. Erseghe**, C. Suitner, "The Semantics of depression: How linguistic agency patterns signal depressive symptoms on social media," submitted to JW&S Depression and Anxiety, Mar 2025.

S2. Lejla L. Dzanko Lejla, J. Nikadon, **T. Erseghe**, C. Suitner, S. Leach, M. Formanowicz, "Linguistic Markers and Intergroup Dynamics: Understanding the Drivers of Social Media Virality," submitted to IC2S2 2025 Conference, Feb 2025.

S3. A. Aghababaei, J. Nikadon, M. Formanowicz, M.L. Bettinsoli, C. Cervone, C. Suitner, **T. Erseghe**, "Application of integrated gradients explainability to sociopsychological semantic markers," submitted to IEEE Transactions on Affective Computing, March 2025.

S4. J, Nikadon, B. Bylicka, C. Suitner, **T. Erseghe**, L. Džanko, M. Beneda, and M. Formanowicz, "Uncovering the Linguistic Drivers of Mobilization: A Theory- and Data-Driven Computational Approach," submitted to

S5. **T. Erseghe**, "A comparative analysis of unsupervised topic detection techniques," in preparation.

S6. V. Bonagura, **T. Erseghe**, C. Foglietta, S. Panzieri, and F. Pascucci, "Performance-guaranteed distributed linear quadratic estimator for spatially exponentially decaying systems," in preparation.

S7. **T. Erseghe**, N. Amini, E. Silvestri, A. Bertoldo, "Community detection in functional brain networks," in preparation.

Journal papers

J1. J. Nikadon, C. Suitner, **T. Erseghe**, L. Dzanko, M. Olech, P. Jurek, M. Formanowicz, "The role of agentic language in mobilizing election candidate support," Journal of Language and Social Psychology, First published online, May 30, 2025.

J2. L. Dzanko, C. Suitner, **T. Erseghe**, J. Nikadon, and M. Formanowicz, "Linguistic features influencing information diffusion in social networks: a systematic review," Elsevier Computers in Human Behavior Reports, Volume 18, May 2025.

J3. J. Nikadon, C. Suitner, **T. Erseghe**, L. Dzanko, and M. Formanowicz, "BERTAgent: the development of a novel tool to quantify agency in textual data," Journal of Experimental Psychology: General (JEPG), online first, May 2025.

J4. C. Suitner, L. Badia, D, Clementel, L. Iacovissi, M. Migliorini, B.G. Salvador Casara, D. Solimini, M. Formanowicz, **T. Erseghe**, "The rise of #climateaction in the time of the FridaysForFuture movement: a semantic network analysis," Elsevier's Social Networks, Volume 75, p. 170-185, October 2023.

J5. **T. Erseghe**, L. Badia, L. Dzanko, M. Formanowicz, J. Nikadon, and C. Suitner, "Projection of Socio-Linguistic Markers in a Semantic Context and Its Application to Online Social Networks," Springer Online Social Networks and Media, Vol. 37-38, September 2023.

J6. S. Eleuch, S. Milani, N. Khouja, **T. Erseghe**, F. Tlili, "A distributed rate-control approach to reduce communication burdens in VSNs," IEEE Access, Vol. 11, pp. 1011-1022, January 2023.

J7. S. Eleuch, N. Khouja, S. Milani, **T. Erseghe**, F. Tlili, "A study on the impact of multi-view distributed feature coding on a multi-camera vehicle tracking system at roundabouts," IEEE Access, Vol. 10, pp. 39502-39517, April 2022.

J8. G. Perin, M. Berno, **T. Erseghe**, M. Rossi, "Towards sustainable edge computing through renewable energy resources and online, distributed and predictive scheduling," IEEE Transactions on Network and Service Management, Vol. 19, No. 1, pp. 306-321, March 2022.

J9. **T. Erseghe**, "New results on the local linear convergence of ADMM: a joint approach," *IEEE Transactions on Automatic Control*, Vol. 66, No. 11, pp. 5096-5111, November 2021.

J10. **T. Erseghe**, G. Caparra„ F. Formaggio N. Laurenti, "On trading the spreading gain with the coding rate and its application to GNSS data component design," IEEE Transactions on Aerospace and Electronic Systems, Vol. 57, No. 4, pp. 2526-2539, August 2021.

J11. D. Cecchinato, **T. Erseghe**, M. Rossi, "Elastic and predictive allocation of computing tasks in energy harvesting IoT Edge networks," IEEE Transactions on Network Science and Engineering, Vol. 8, No. 2, pp. 1772-1788, April-June 2021.

J12. B.G. Salvador Casara, C. Suitner, **T. Erseghe**, "Immigrazione, stili e temi: uno studio sui tweet dei politici italiani," Rivista italiana Ricerche in Psicologia, Vol. 43, No. 1, pp. 351-371, May 2020.

J13. M. Rossi, M. Centenaro, A. Ba, S. Elleuch, **T. Erseghe**, M. Zorzi, "Distributed learning algorithms for optimal data routing in IoT networks," *IEEE Transactions on Signal and Information Processing over Networks*, Vol. 6, No. 2, pp. 179-195, February 2020.

J14. 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.

J15. **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.

J16. **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.

J17. **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.

J18. **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.

J19. **T. Erseghe**, "Distributed optimal power flow using ADMM," *IEEE Transactions on Power Systems*, Vol. 29, No. 5, pp. 2370-2380, September 2014.

J20. **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.

J21. A. R. Di Fazio, **T. Erseghe**, E. Ghiani, M. Murroni, 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.

J22. **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.

J23. **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.

J24. **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.

J25. **T. Erseghe**, "A distributed and scalable processing method based upon ADMM," *IEEE Signal Processing Letters*, Vol. 19, No. 9, pp. 563-566, September 2012.

J26. **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.

J27. **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.

J28. **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.

J29. 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.

J30. **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.

J31. **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.

J32. **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.

J33. **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.

J34. **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.

J35. **T. Erseghe**, G. Cariolaro, "Efficient DFT architectures based upon symmetries," *IEEE Transactions on Signal Processing*, Vol. 54, No. 10, pp. 3829-3838, October 2006.

J36. (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.

J37. **T. Erseghe**, "Capacity of UWB Impulse Radio with single-user reception in Gaussian noise and dense multi-path," *IEEE Transactions on Communications*, Vol. 53, No. 8, pp. 1257-1262, August 2005.

J38. **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.

J39. **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.

J40. **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.

J41. G. Cariolaro, **T. Erseghe**, P. Kraniauskas, "The fractional discrete cosine transform," *IEEE Transactions on Signal Processing*, Vol. 50, No. 4, pp. 902-911, April 2002.

J42. 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.

J43. G. Cariolaro, **T. Erseghe**, P. Kraniauskas, N. Laurenti, "Multiplicity of fractional Fourier transforms and their relationships," *IEEE Transactions on Signal Processing*, Vol. 48, No. 1, pp. 227-241, January 2000.

J44. **T. Erseghe**, P. Kraniauskas, G. Cariolaro, "Unified fractional Fourier transform and sampling theorem," *IEEE Transactions on Signal Processing*, Vol. 47, No. 12, pp. 3419-3423, December 1999.

J45. G. Cariolaro, **T. Erseghe**, P. Kraniauskas, N. Laurenti, "A unified framework for the fractional Fourier transform," *IEEE Transactions on Signal Processing*, Vol. 46, No. 12, pp. 3206-3219, December 1998.

J46. P. Kraniauskas, 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 conferences

C1. L. Džanko, J. Nikadon, C. Suitner, **T. Erseghe**, and M. Formanowicz, "Linguistic factors influencing information diffusion in social networks: a systematic review," accepted at 18th International Conference on Language and Social Psychology, ICLASP24, Tallinn, Estonia, June 12-15, 2024.

C2. **T. Erseghe**, L. Džanko, L. Badia, M., J. Nikadon, Formanowicz, C. Suitner, "PLMP: A Method for projecting linguistic markers of socio-psychological processes on target words," accepted at 18th International Conference on Language and Social Psychology, ICLASP24, Tallinn, Estonia, June 12-15, 2024.

C3. S. Filippi, L. Džanko, **T. Erseghe** and C. Suitner, "What about male partners? Analysis of online discourses in the Pro-life and Pro-Choice Twitter communities," accepted at 18th International Conference on Language and Social Psychology, ICLASP24, Tallinn, Estonia, June 12-15, 2024.

C4. J. Nikadon, L. Dzanko, **T. Erseghe**, C. Suitner, M. Olech, P. Jurek, M. Formanowicz, "BERTAgent: A Novel Tool for Quantifying Linguistic Agency: An Application in the Analysis of Mobilising Election Candidate Support on Twitter during the 2020 U.S. Congressional Elections," accepted at 18th International Conference on Language and Social Psychology, ICLASP24, Tallinn, Estonia, June 12-15, 2024.

C5. J. Nikadon, L. Dzanko, **T. Erseghe**, C. Suitner, M. Olech, P. Jurek, and M. Formanowicz, "BERTAgent: A Novel Tool for Quantifying Linguistic Agency: Development, Validation and an Application in the 2020 U.S. Election Tweets," IC2S2 2023, Copenhagen, Denmark, July 17-20, 2023.

C6. **T. Erseghe**, L. Badia, L. Dzanko, C. Suitner, "PLMP: A method to map the linguistic markers of the social discourse into its semantic network," ACM/IEEE ASONAM 2022, Istanbul, Turkey, November 10-13, 2022.

C7. A.V. Guglielmi, G. Cisotto, **T. Erseghe**, and L. Badia, "Frequency-Dependent Functional Connectivity of Brain Networks at Resting-State," IEEE BMEiCON22, Songkla, Thailand, November 10-13, 2022.

C8. S. Eleuch, S. Milani, N. Khouja, **T. Erseghe**, F. Tlili, "A Comparative Evaluation of Well-known Feature Extractors for Multi-view Vehicle Tracking in VSNs," IEEE ComNet 2022, Hammamet, Tunisia, November 1-4, 2022.

C9. **T. Erseghe**, C. Suitner, L. Dzanko, B.G. Salvador Casara and M. Formanowicz, "Inspecting social networks through the lens of Network Science," 45th Annual Scientific Meeting of the International Society of Political Psychology, ISPP22, Athens, Greece, 14-17 July, 2022.

C10. B.G. Salvador Casara, **T. Erseghe**, C. Suitner, and M. Formanowicz, "Climate change, rhetoric change, and social change: a semantic network approach to the investigation of online discourse evolution," 45th Annual Scientific Meeting of the International Society of Political Psychology, ISPP22, Athens, Greece, July 14-17, 2022.

C11. J. Nikadon, L. Dzanko, **T. Erseghe**, C. Suitner, and M. Formanowicz, "Politicians caught red-handed. Using language in a purposeful manner conditioned on the actual phase of the election cycle: Agency and concreteness in semantic communities of political messages on social media," 45th Annual Scientific Meeting of the International Society of Political Psychology, ISPP22, Athens, Greece, July 14-17, 2022.

C12. L. Dzanko, **T. Erseghe**, C. Suitner, and S. Filippi, "What about male partners? A semantic network analysis of online discourses in the Pro-life and Pro-Choice Twitter communities," 45th Annual Scientific Meeting of the International Society of Political Psychology, ISPP22, Athens, Greece, July 14-17, 2022.

C13. L. Dzanko, J. Nikadon, **T. Erseghe**, C. Suitner and M.Formanowicz, "Analysing political discourse before and after election using Tweets posted by the candidates for the 2020 US Elections", The 17 th International Conference on Languageand Social Psychology, ICLASP17, Hong Kong, June 23-25, 2022.

C14. **T. Erseghe**, L. Badia, L. Dzanko, C. Suitner, "A method to map the linguistic markers of the social discourse into its semantic network," Interdisciplinary Small Group Meeting on Language and Social Cognition, SWPS University, Sopot, June 13, 2022.

C15. L. Badia, D, Clementel, **T. Erseghe**, L. Iacovissi, M. Migliorini, B.G. Salvador Casara, C. Suitner, "Structural and semantic impact of online collective action," NetSci 2020 Conference, Rome, Italy, Sept 17-25, 2020.

C16. S. Eleuch, N. Khouja, **T. Erseghe**, F. Tlili, "Feature-based vehicle tracking at roundabouts in visual sensor networks," *17th IEEE International Multi-Conference on Systems, Signals & Devices (SSD)*, Sfax, Tunisia, July 20-23, 2020.

C17. **T. Erseghe**, N. Laurenti, M. Zecchin, "Coding Bounds in the Finite-Block-Length Regime: an Application to Spread-Spectrum Systems Design," *AEIT International Conference 2019*, Firenze, Italy, September 18-20, 2019.

C18. **T. Erseghe**, "A distributed algorithm for fast optimal power flow regulation in smart grids," *IEEE SmartGridComm 2014*, pp. 31-36, Venice, Italy, November 3-6, 2014.

C19. 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, May 13-16, 2014.

C20. C. Codemo, **T. Erseghe**, A. Zanella, "Energy storage optimization strategies for smart grids," *IEEE ICC 2013*, pp. 4089 - 4093, Budapest, Hungary, June 9-13, 2013.

C21. **T. Erseghe**, S. Tomasin, "Plug and Play Topology Estimation via Powerline Communications for Smart Micro Grids," *WSPLC 2012*, Rome, Italy, September 20-21, 2012.

C22. 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.

C23. 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.

C24. 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.

C25. **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.

C26. 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, August 30–September 1, 2011.

C27. A. Costabeber, **T. Erseghe**, P. Tenti, S. Tomasin, "Optimum control of distributed energy resources in residential micro-grids," *IEEE PowerTech 2011*, Trondheim, D, June 19-23, 2011.

C28. 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.

C29. S. Tomasin, **T. Erseghe**, "Constrained optimization of local sources in Smart Grids by SDP approximation," *IEEE ISPLC 2011*, Udine, Italy, April 3-6, 2011.

C30. D. Forner, **T. Erseghe**, S. Tomasin, P. Tenti, "On efficient use of local sources in smart grids with power quality constraints," *IEEE SmartGridComm 2010*, Gaitersburg, Maryland, USA, October 4-6, 2010.

C31. 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.

C32. 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.

C33. **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.

C34. 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.

C35. **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.

C36. **T. Erseghe**, S. Tomasin, "Optimized demodulation for MAI resilient UWB W-PAN receivers," *ICC 2008*, Beijing, China, May 19-23, 2008.

C37. **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.

C38. **T. Erseghe**, "A low-complexity Impulse Radio receiver based upon Gaussian mixtures," *ICC 2007*, Glasgow, Scotland (UK), pp. 4311-4316, June 24-28, 2007.

C39. **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.

C40. 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.

C41. **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.

C42. 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.

C43. **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.

C44. **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.

C45. 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.

C46. 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.

C47. **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.

C48. **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.

C49. 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.

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.

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.

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).

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.

SIGNIFICANT RESEARCH ACHIEVEMENTS
(from the latest to the oldest)

Social network analysis

The tools provided by Network Science and Machine/Deep Learning are valuable assets to investigate the properties of a social network. This **interdisciplinary** research, carried out in collaboration with colleagues from **social psychology** in Padova and SWPS Warsaw, aims at identifying methods to reliably analyse online social platforms (like Twitter, Reddit, TikTok, etc), with a specific target on the structure and role of semantics, the identification of topics and/or groups of interest, as well as the link between network analytics and social-psychology drives, or, better, their proxy measures. The main contributions are:

1. The performance comparison of unsupervised topic detection methods, among the many available in the literature (ranging from Louvain and InfoMap principles, LDA and NMF and their generalizations through variational autoencoders and deep learning networks, stochastic block models, embedding models like BERTopic, etc), is addressed in [S5], identifying Louvain as the most robust choice under many reliable performance measures.
2. The use of the Louvain approach for topic detection was applied in different contexts, providing relevant insights in the data analysis. The evolution of the online discourse on Twitter over climate change was studied in [J4], [C10]; an analysis of pro-life and pro-choice Twitter communities is available in [C3], [C12]; an analysis of the political discourse around US elections is available in [C13]; a network study on the communication style of Italian politicians is available in [J12].
3. The role of agency (i.e., strive to achieve a goal, mainly expressed by the presence of words that convey the idea of action) as a key socio-psychological factor led to the development and training of a deep learning (validated) tool based on RoBERTa, which is able to extract the level of agency from textual data [J3] (BERTAgent, https://pypi.org/project/bertagent), similarly to what is commonly done with sentiment analysis. The tool was used to investigate the role of agency during US elections in [J1], [C4], [C5], [C11], and in depression states [S1].
4. Explainability methods at the word-level were investigated for agency or any socio-psychological marker of interest in [S3] by use of an integrated gradient technique.
5. An unsupervised method to project a socio-psychological marker (e.g., sentiment, agency) from the document level to the word level, based on a modification of PageRank and named PLMP, was proposed in [J5] (see also [C2], [C6], [C14], [C15]).
6. The role of linguistic factors in influencing information diffusion in social networks was addressed in [S2], [J2], [C1].

Distributed processing

The aim of the research is to identify methodologies to solve a minimisation problem in a fully decentralised way, that is, in such a way that only local parameters exchanges between neighbour nodes or neighbour 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 neighbour regions/nodes parameters. The kind of application scenarios is vast, ranging from the electrical world (optimal power flow like problems), localisation problems in wireless sensor network scenarios, maximum likelihood decoding procedures, etc. The research 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 theoretical analysis of ADMM convergence was addressed in [J9], which identifies a method to effectively locate the eigenvalues of a reference ADMM matrix that sets the convergence speed.
2. A general method to adapt ADMM to complex networked problems, either convex or non convex, was presented in [J25].
3. A flow allocation problem over a wireless network was solved in a distributed fashion in [J13] by exploiting the method in 2.
4. A resource allocation problem in an Edge computing infrastructure was solved in a distributed fashion in [J8] by exploiting the method in 2. The application considers an energy allocation/harvesting scenario, building on (and adapting) the centralized model developed in [J11].
5. A method for distributed sensor network localisation was proposed in [J17] and refined in [J14]. The method is proved to converge, irrespective of the exact that localisation is an highly non-linear problem, and it is also shown to be reliable under harsh non-Gaussian scenarios.
6. A fast distributed consensus algorithm (i.e., distributed evaluation of the mean value of local measurements) based upon ADMM was studied in [J27], and was proved to possess improved resilience to noise. The approach was used in [C28] for distributed synchronisation in a sensor network.
7. The optimal power flow (OPF) problem of optimally setting electrical parameters in a power grid was addressed in [J19], [C18]. 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 [J18].

Coding in the finite blocklength regime

Coding bounds in the finite blocklength regime have the 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 [J16] to evaluate the bound recently proposed by Polyansky, Poor, and Verdu in an AWGN context. The idea was generalized in [J15] 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 was in the BI-AWGN case. The new bound clearly shows that current demodulation through message-passing is 1 dB suboptimal [J15].
3. The theoretical bounds were used in [J10], [C17] to identify optimal system settings for a spread-spectrum system, a thorough analysis being specifically conducted on GNSS signalling formats.
4. A matlab code that implements the BI-AWGN bound is available in SPECTRE (short packet communication toolbox), a MIT project led by Prof. Y. Polyanskiy (see http://github.com/yp-mit/spectre).

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 [J24] 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 [J19] by exploiting the ADMM approach. The solution has been refined in [C18] to obtain a reliable and fast algorithm. A stronger result with a convergence guarantee and applicability to larger networks is available in [J18].
3. Powerline communication (PLC) modules equipped with ranging capabilities are exploited in [J23] 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 [J20], [J22] 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 [J34], and methods for low complexity implementation are given in [J33].
2. A generalization to more complex generalized GMs is presented in [J32] 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 [J28], and a low-complexity alternative based upon the Schmidl-Cox principle, carefully adapted to the TH access, was proposed in [J26]. 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 [J40] by use of Galois fields properties.
2. A methodology to design low-complexity UWB-IR receivers operating in full-duplex mode was discussed in [J36].
3. The capacity of UWB-IR systems in dependence of the chosen PPM format were discussed in [J37].

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 [J31]. As a side result of this research a closed-form expression for Schmidl-Cox packet detection was found in [J30].
2. Optimum temporal synchronization in the presence of long dispersive channel is studied in [C34].

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 [J42] by use of the theory of variable length codes.
2. Study of multi-h continuous phase modulation (CPM) formats was conducted in [J29] by use of the theory of finite state machines. A novel closed form expression providing very simple computational complexity was found.

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 [J46].
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 [J44].
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 [J38].

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 [J43], [J45].
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 [J39], and the related fractional DFT was shown to have an efficient implementation (FFT like) in [J35].
3. Fractional discrete cosine transforms (DCTs) were proposed in [J41].

PUBLICLY FUNDED PROJECTS

SID24
2024-2026
24 months
Shaping body image and consumer behavior: The power of idealized and sexualized social media
Funded by University of Padova (SID projects 2024)
Interdisciplinary project in collaboration with the Department of Developmental Psychology and Socialization

RESTART
2022-2025
36 months
RESearch and innovation on future Telecommunications systems and networks, to make Italy more smART (RESTART)
Funded by Piano Nazionale di Ripresa e Resilienza (PNRR)
Spoke 1, Pervasive and Photonic Network Technologies and Infrastructures

AGENCY20
2020-2024
36 months
The Role of Linguistic Markers of Agency in Mobilizing Collective Action.
Polish National Science Foundation Grant 2020/37/B/HS6/02587.
Interdisciplinary project in collaboration with SWPS Warsaw.

MORE GOSSIP
2016-2019
30 months
More GNSS Open Service Signal Integrity Protection and Authentication at the Physical Layer
Funded by the European Space Agency (ESA)
Collaborator and internal WP leader for channel coding issues related to European GNSS (Galileo).

U-DVB
2010-2011
24 months
Algorithm development for a universal trans-modulation system for DVB-S and DVB-T signals
Funded by Veneto Region (Italy) under the L.R. 9 Fund
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
Funded by University of Padova
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
Funded by University of Padova
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
Funded by the Fund for Projects of Relevant National Interest (PRIN)
Collaboratorr 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
IST Project No. FP6-IST-2003-507325
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
Funded by the National Fund for Investments on Basic Research (FIRB)
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
IST Project No. FP6-IST-2003-506969
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
IST Project No. FP5-IST-1999-20859
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
Funded by the Research Projects National Fund for Joung Researchers
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 organisation
Network science	24/25	86.4%	84.5%	88.4%
Network science	23/24	83.2%	84.5%	87.6%
Network science	22/23	85.2%	86.8%	87.7%
Network science	21/22	87.5%	89.8%	88.7%
Network science	20/21	87.2%	89.5%	97.5%
Network science	19/20	83.6%	86.0%	87.9%
Network science	18/19	85.7%	84.6%	85.1%
Network science	17/18	74.9%	78.5%	79.0%
Social network analysis	24/25	82.7%	86.9%	88.8%
Social network analysis	23/24	72.5%	75.0%	77.4%
Social network analysis	22/23	73.0%	75.8%	77.9%
Social network analysis	21/22	85.5%	84.5%	81.2%
Social network analysis	20/21	92.5%	98.2%	93.1%
Segnali e sistemi	23/24	82.3%	82.0%	84.3%
Segnali e sistemi	22/23	82.8%	81.8%	85.2%
Segnali e sistemi	21/22	83.2%	82.4%	82.9%
Segnali e sistemi	20/21	81.0%	80.9%	89.2%
Segnali e sistemi	18/19	84.7%	85.6%	86.4%
Segnali e sistemi	17/18	77.0%	77.0%	82.0%
Segnali e sistemi	16/17	74.9%	76.0%	77.8%
Segnali e sistemi	09/10	80.3%	85.9%	77.4%
Segnali e sistemi	08/09	80.0%	87.0%	80.9%
Digital signal processing	19/20	89.8%	90.5%	91.0%
Network coding	19/20	81.4%	77.9%	84.3%
Channel coding	17/18	88.3%	90.8%	97.1%
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%

Interdisciplinary teaching method

A noteworthy **interdisciplinary** method of teaching, quite unique in the academia, and connected to the subject of “social network analysis”, was devised (and also won a prize, see later on).

1. Two parallel courses of **“Social network analysis” (SNA)** and **“Network science”(NS)** were activated in two, apparently divergent, master degrees, namely “Communication strategies” (social science) and “ICT for Internet and multimedia/Data science” (engineering/mathematics), respectively.

2. **Two instructors**, one from a mathematical background and one from a social-psychology background, run together the two parallel courses. NS students mainly learn algorithms for the analysis of social networks, and SNA students mainly learn those socio-psychological aspects that are able to identify relevant research questions, but both SNA and NS students also learn their twin-course aspects in an intuitive way.
3. SNA and NS students, on a free basis, join **interdisciplinary projects (IPs)** with the aim of solving the study of a relevant research question on a specific issue by joining together social and mathematical competencies. It's a peer-to-peer evaluation process, helped by the constant feedback (and discussion) with instructors. IPs are jointly presented by SNA and NS students in a dedicated day session.
4. New ideas and suggestions coming from IPs are used to constantly update the courses contents.

University modules/courses given @ unipd

✓ **Network science**, given in English, for graduate students, 6 ECTS credits – Academic years 2018/2019, 2019/2020, 2020/2021, 2021/2022, 2022/2023, 2023/2024, 2024/2025

Topics: *Basic network properties* - graphs, adjacency matrix, degree distribution, connectivity. *Network models* - Erdos-Renyi model; Random graphs; Power laws and scale free networks; Small world phenomena; Hubs; Network generation and expansion; Barabasi-Albert model; Preferential attachment; Evolving networks. *Centrality measures* - Hubs and authorities; PageRank: teleportation, topic specific ranking, proximity measures, trust rank; Eiegnvector, Katz, closeness, harmonic, and betweenness centralities; The clustering coefficient. *Community detection (unsupervised)* - basic performance measures (modularity, NMI, Ncut, InfoMap), clustering algorithms (Louvain, spectral clustering, InfoMap, stochastic block models, BIGClam, Dendrograms, HDBSCAN) and their properties. *Semantic networks* - building the network, unsupervised topic detection algorithms algorithms (LDA, NMF, variational autoencoders, the transformer architecture and BERTopic), sentiment analysis. *Other aspects* - Assortativity; Polarization; Eco chambers; Robustness, Link prediction. *Labs* - Twitter, Gephi, and igraph labs.

✓ **Social network analysis**, given in English, for graduate students @ Master in Strategies in Communications, 3 ECTS credits module – Academic year 2020/2021, 2021/2022, 2022/2023, 2023/2024, 2024/2025

Topics: a selection of topics from the Network Science module.

✓ **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, 2018/2019, 2020/2021, 2021/2022, 2022/2023, 2023/2024, 2024/2025

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.

✓ **Digital signal processing**, given in English, for graduate students, 6 ECTS credits – Academic year 2019/2020

Topics: FFT - Decimation in time and frequency, Overlap & add and overlap & save block convolution, Bluestein's approach to zooming in frequency; FIR filters - Type I,II,III, and IV linear phase filters, FIR filter design as a linear optimisation problem, The windowing techniques, The frequency sampling technique, Remez algorithm; IIR filters - Basic fundamental systems, All pass + minimum phase decomposition, The transform method, Butterworth, Chebyshev and elliptic filters; Multirate - Interpolation and decimation systems properties and polyphase implementation, Sampling rate conversion.

✓ **Network coding**, given in English, for graduate students, 3 ECTS credit module – Academic year 2019/2020

Topics: Linear codes; LDPC, BICM, and polar codes; Graphical representation of codes; Message passing; belief propagation decoding; min-sum and sum-product algorithms; polar decoding.

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

✓ **Channel coding**, given in **English**, for graduate students, 6 ECTS credits in Academic year 2017/2018 – 9 ECTS credits in Academic years 2013/2014, 2014/2015, 2015/2016, 2016/2017 – 6 ECTS credits in Academic years 2011/2012, 2012/2013 under the name **Channel codes and capacity**

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.

✓ **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.

✓ **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.

✓ **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.

MOOC courses

✓ **Foundations of signals and systems**, in English, 5 week massive open online course (MOOC) - 20 lectures - in preparation - will be freely available at www.futurelearn.com on April 2025.

Structure: 20 lectures, 40 short videos, each accompanied by slides for the theoretical part, a series of solved exercises, a homework assignment (with solutions) and a series of multiple choice quizzes to test students' preparation.

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; signal processing in MatLab.

Dissemination activity

✓ **Digital filter design**, in English, 6 hour course given @ ST Microelectronics, Cornaredo, Milan, Italy, October 6th, 2020, and repeated on June 9th, 2021.

Topics: FFT - Decimation in time and frequency, Overlap & add and overlap & save block convolution, Bluestein's approach to zooming in frequency; FIR filters - Type I,II,III, and IV linear phase filters, FIR filter design as a linear optimisation problem, The windowing techniques, The frequency sampling technique, Remez algorithm; IIR filters - The transform method; Multirate - Interpolation and decimation systems properties and polyphase implementation, Sampling rate conversion, Digital counterparts to analog filters.

✓ **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.

PROFESSIONAL ACHIEVEMENTS (miscellaneous)

Italian professor Qualification

- ✓ *ASN, abilitazione scientifica nazionale*
  Qualification to full professorship
  Received on 30/07/2018 - Valid until 30/07/2030

Periods abroad

- ✓ Erasmus+ exchange program (staff mobility for teaching KA131), University of Social Sciences and Humanities (SWPS), Warsaw, Poland, November 4-8, 2024.
- ✓ Erasmus+ exchange program (staff mobility for teaching KA131), Danmarks Tekniske Universitet (DTU), Lyngby, DK, June 27-July 1, 2022.
- ✓ Snell & Wilcox ltd, UK
  R&D researcher from Jan. 1, 1997 to Apr. 30, 1999
  Working on video standard conversion and video archive restoration

Educational committees activity

- ✓ Rector's Delegate for **Internships**, Master Degree on Data Science, University of Padova – academic years 2021/2022, 2022/2023, 2023/2024, 2024/2025.
- ✓ Member of the **Steering Committee** (Comitato Ordinatore) for the Master Degree in Data Science, University of Padova – academic years 2022/2023, 2023/2024.
- ✓ **President** of the Commission for International Admission to the Master in ICT for Internet and Multimedia, University of Padova, Italy, academic year 2023/2024.
- ✓ **President** of the Commission for the Admission to the PhD in Information Engineering, University of Padova, Italy, year 2019.
- ✓ PhD Program Board (**Collegio Docenti Dottorato**) Member for the PhD in Information Engineering, University of Padova – academic years 2017/2018, 2018/2019, 2022/2023, 2023/2024, 2024/2025.
- ✓ 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, 2017/2018.
- ✓ Final Exam Commission for the PhD in Information Engineering, University of Padova, Italy, year 2018.
- ✓ Final Exam Commission for the International PhD in Industrial and Information Engineering, University of Udine, Italy, year 2015.
- ✓ 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

- ✓ Website Committee (**Commissione Web**) Member at the Department of Information Engineering, University of Padova – academic year 2006/2007
- ✓ Technical Committee Member at the Summer School on Information Engineering (years 2002, 2003, 2004, 2005), organized by the University of Padova

Other committees

- ✓ Member of the Evaluation Committee for assigning two RTDA Research Grants (Decreto Rettorale n. 2219, May 26, 2023), Dept. of Information Engineering, University of Padova.
- ✓ Member of the Evaluation Committee for assigning one RTDA Research Grant (Decreto Rettorale n. 1102, March 13, 2023), Dept. of Information Engineering, University of Padova.
- ✓ 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

Invited seminars

- ✓ "Social network analysis: network science and machine learning meet psychology," University of Roma 3, Dipartimento di Ingegneria Industriale, Elettronica e Meccanica, April 5, 2024.

Miscellaneous

- ✓ "Il deepfake è il prezzo della libertà," Interview for "il Mondo", April 19, 2024.
- ✓ "Dal microprocessore alla consapevolezza," a talk with Federico Faggin, Orto Botanico, Università di Padova, October 24, 2017.

Prizes

- ✓ "Arqus UNIPD Award for innovative teaching practices," University of Padova, May 7, 2024.

Committee activity in int. conferences

- ✓ Program Co-Chair at 13th Int'l Symposium on Image and Signal Processing and Analysis (ISPA 2023), Rome, Italy, September 18-19, 2023
- ✓ 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 many international IEEE conferences.

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, EURASIP, IEEE, SIAM, SPIE.

SUPERVISING ACTIVITY

2025

Muhammad Tabish, “Deep Learning-Based Framework for Image Sentiment Analysis,” (Computer Science master degree), April 2025

Reza Khaleghi, “Analyzing Facial Features, Position, and Color Attributes in Social Media Videos for Behavioral Psychology Studies,” (ICT for Internet and multimedia master degree), March 2025

Shima Shokrpour, “Multimodal Analysis in Short-Form Video Content: Integrating Skin Exposure Detection and Body Posture Recognition on TikTok,” (ICT for Internet and multimedia master degree), March 2025

Seyed Amir Hossein Abedi, “Optimizing Content Production Cycles with AI Technology,” (ICT for Internet and multimedia master degree), March 2025

Greku Nikola, “Simulazione della Copertura su TikTok: Un Modello Probabilistico dell’Algoritmo di Raccomandazione,” (Information Engineering bachelor degree), March 2025

Akram Lamachi, “Dispositivi Medici e Strutture Ospedaliere: Certificazione, Sicurezza e Innovazione nella Progettazione tramite Stampa 3D,” (Biomedical Engineering bachelor degree), March 2025

Suly Vannesa Cifuentes Bohorquez, “Customer segmentation using clustering algorithms: A comparative study for an Italian fashion retail company,” (ICT for Internet and multimedia master degree), February 2025

2024

Marija Cveevska, “Design and Analysis of Maintenance Scheduling Algorithms for Offshore Aeroderivative Engines: An Operations Research Problem,” (Data Science master degree), December 2024

Erica Marras, “Cross-Provider POI categories mapping with an embedding approach,” (Data Science master degree), December 2025

Daniele Barolo, “Auditing open-source LLMs for academic author search,” (Data Science master degree), December 2024

Alina Agurenko, “Semantic analysis of social aspects in textual data: Exploring agency and emotions with NLP techniques,” (ICT for Internet and multimedia master degree), October 2024

Andrea Pizzolato, “Human mobility with Telco data: design of localization and profiling algorithms,” (Data Science master degree), September 2024

Muhammed Selim Dayanç, “Semantic analysis of socio-psychological aspects using machine learning and network science,” (Erasmus+ internship), September-October 2023

Dafina Berisha, “Real Project Implementation and Knowledge Graph Development,” (Data Science master - internship), July 2024

Mikhail Kolobov, “Enhanced Forecasting Models: Implementation and Comparative Analysis of Sibylla 5.0 with Prophet and NeuralProphet Algorithms,” (Data Science master degree), July 2024

Robert Philippe, “Sequential and Quantitative Analysis of Financial Signals: Analyzing the Impacts of Share Buybacks, Director Dealings, and Investor Transactions on Company Performance,” (Data Science master degree), July 2024

Bita Darabi, “Convolutional Neural Networks for Classification of Neurodevelopmental Disease Using fMRI Data ,” (Data Science master degree), April 2024

Andrii Kliachkin, “Fairness in Ranking via randomized algorithms,” (Data Science master degree), April 2024

Durmus Tulan, “The Comparison of the Most Listened-to songs of 2000-2020 from within Network Science Perspective and the investigation and explanation of their effects on Human Psychology,” (ICT for Internet and multimedia master degree), March 2024

2023

Mohammad Huzaifa Fazal, “Table detection and table structure recognition from PDF documents,” (Data Science master degree), December 2023

Stefanjia Galevska, “The use of classification models and NLP methods for digitalization of document tagging in industrial applications,” (Data Science master degree), December 2023

Laia Porcar Guillamon, “Amazon’s Socks Bestseller Analysis: key trends and drivers,” (Data Science master degree), December 2023

Michele Zanatta, “Intelligent System Design for Advanced Anomaly Detection in Structured Datasets,” (Data Science master degree), December 2023

Yosr Ben Taher, “Predictive Modelling and Strategies for Customer Churn Reduction: Loyalty Program Case,” (Data Science master degree), December 2023

Khanshaghaghir Bahar, “Screening of materials for hydrogen adsorption using Machine Learning,” (Data Science master degree), December 2023

Matteo Posenato, “Overview of the multi-task mutual learning technique: a comparative analysis of different models for sentiment analysis and topic detection,” (Data Science master degree), December 2023

Meliha Duman, “Empirical Validation of LoRaWAN Network Coverage Strategies for IoT Deployments,” (ICT for Internet and multimedia master degree), December 2023

Masoud Javidfar, “Enhanced Topic Modeling for Textual Data,” (ICT for Internet and multimedia master degree), December 2023

Farin Binta Zahir, “An Experimental Assessment of the Efficacy of BERTopic,” (ICT for Internet and multimedia master degree), December 2023

Alberto Grespan, “The electromyogram: an overview of signal processing, signal acquisition and muscular onset detection techniques,” (Biomedical Engineering bachelor degree), November 2023

Camilla Meneghetti, “The operating microscope: origins, evolution and innovations of the technology in surgical procedures,” (Biomedical Engineering bachelor degree), November 2023

Sani Ester, “Temperature sensors and communication technologies,” (Biomedical Engineering bachelor degree), September 2023

Giulia Tecchio, “Epileptic electroencephalographic signal: spectral analysis and machine learning,” (Biomedical Engineering bachelor degree), September 2023

Cecile Obeid, “Academic analytics and recommendation using dashboards,” (Data Science master degree), September 2023

Berke Furkan Kusmenoglu, “Lost Revenue Recognition in E-commerce: Identifying Causes and Implications,” (Data Science master degree), September 2023

Burak Feyzullah Cilbir, “Network science analysis of Twitter and Reddit,” (Eramus+ trainee internship), July-Septembner 2023

Esra Akgul, “Network science analysis of Twitter and Reddit,” (Eramus+ trainee internship), July-Septembner 2023

Elisa Tremolada, “The Power of Words: Using text analysis to investigate the role of populist rhetoric on Twitter,” (Data Science master degree), July 2023

Diem Le Ngoc, “The Influence Of misinformation on Twitter during COVID-19,” (Data Science master degree), July 2023

Johanna Weiss, “Understanding acquisition prices at Swiss hypermarket: a time series approach on predicting acquisition prices,” (Data Science master degree), July 2023

Seyed Mohammad Javad Modaresi, “Topic-based influence maximization in presence of competitors,” (ICT for Internet and multimedia master degree), July 2023

Selen Arslan, “Linguistic analysis of agency in online discussions about postpartum,” (ICT for Internet and multimedia master degree), April 2023

Luca Pessina, “A data-driven approach to designing, developing and launching a startup,” (Data Science master degree), April 2023

Salma Eleuch, “Efficient Joint Feature Selection and Coding For Multi-view Vehicle Tracking in Visual Sensor Networks,” (PhD thesis), April 2022

Kimia Hashemi, “Relationship between frontal-parietal alpha oscillations and visual working memory task,” (ICT for Internet and multimedia master degree), March 2023

Arvin Rastegar, “Explaining Rocket time series classifier model,” (Data Science master degree), February 2023

2022

Irene Zampieri, “Come si diffondono le fake news? L’influenza dei gruppi di minoranza nell’ambiente Twitter,” (master degree, in italian), December 2022

Gabriele Carbone, “Overtourism and AI: a model for sustainable development,” (master degree), December 2022

Rodrigo Alejandro Arrianza Alonzo, “XAI for anomaly detection in accounting transactions: Humanitarian Organization (World Food Programme) Context,” (master degree), December 2022

Ramsha Ambreen, “Development of a Verification Management System for pre-silicon verification of automotive products,” (master degree), December 2022

Francesco Lepore, “ECG signal filtering for noise removal and LMS method,” (bachelor degree, in italian), November 2022

Eda Firat, “Analyzing quality of experience (QoE) data through network science tools,” (Erasmus+ trainee internship), August-October 2022

Fatma Betül Zengin, “Network science analysis for assessing the quality of experience/user experience in virtual reality/immersive technologies,” (Erasmus+ trainee internship), August-October 2022

Kemal Yağlı, “Clustering techniques applied to quality of experience (QoE) data,” (Erasmus+ trainee internship), August-October 2022

Chiara Da Villa, “Wearable devices for the detection and processing of electrocardiographic signals,” (bachelor degree), July 2022

Francesca Feriti, “Improving the usability of a QMR electrosurgical generator,” (bachelor degree), July 2022

Venkata Avinash Jakkampudi, “Analysis of Robust Internet Instant Messaging Protocols for Chat Applications,” (master degree), July 2022

Lejla Dzanko, “Semantic network analysis of Twitter data and their psico-social implications,” (master degree), February 2022

Salma Eleuch, PhD candidate of SUPELEC, Tunis, under a co-tutelage agreement with the University of Padova.

Nastaran Amini, PhD candidate at the University of Padova.

2021

Francesco bianchin, “Studio degli algoritmi di rappresentazione dei grafi basati sulla forza,” (bachelor degree), November 2021

Bianca R. C. de Andreade, “Key Performance Indicator calculation and network traffic analysis for videoconference services,” (master degree), October 2021

Filippo Bragato, “Analisi, implementazione e applicazione di algoritmi di community detection,” (bachelor degree), September 2021

Annalaura Zilio, “La gestione e il rinnovo delle apparecchiature elettromedicali nel Project Financing ospedaliero,” (bachelor degree), September 2021

Lynda Nduta Wainaina, “Global discovery of pathogens: A network analysis and modeling,” (master degree), September 2021

Sara Gomiero, “Local community detection in multi-layer networks,” (bachelor degree), July 2021

Reihaneh Fayyaz, “An analysis of application layer protocols in IoT systems” (master degree), April 2021

Salma Eleuch, PhD candidate of SUPELEC, Tunis, under a co-tutelage agreement with the University of Padova.

Nastaran Amini, PhD candidate at the University of Padova.

2020

Salma Eleuch, PhD candidate of SUPELEC, Tunis, under a co-tutelage agreement with the University of Padova.

Leonardo Sartori, “Mixed data clustering for insurance market segmentation” (master degree), December 2020

Alessandro Epulandi, “Analysis of misinformation on Twitter in the time of COVID-19” (master degree), October 2020

Nicola Schiavon, “A scalable graph-based job recommendation system” (master degree), October 2020

Silvia Marino, “Modelli matematici in epidemiologia : trasmissione del covid-19,” (bachelor degree), September 2020

Lucrezia Navarin, “Algorithms for fake news detection: CSI and Naive Bayes,” (bachelor degree), September 2020

Federico Gessato, “Tecniche per l’individuazione di fake news,” (bachelor degree), September 2020

Alessandro Buratto, “Community detection e il metodo di Louvain: analisi del problema computazionale e delle performance dell’algoritmo per l’ottimizzazione della modularità,” (bachelor degree), September 2020

Nastaran Amini, “Community and hub detection in human functional brain networks ,” (master degree), September 2020

Federico Benetazzo, “HDBSCAN*: algoritmo di clustering gerarchico basato sulla densità spaziale,” (bachelor degree), February 2020

2019

Salma Eleuch, PhD candidate of SUPELEC, Tunis, under a co-tutelage agreement with the University of Padova.

Nahuel Coliva, “DBSCAN: clustering basato sulla densità spaziale,” (bachelor degree), September 2019

Francesco Fregona, “Analysis of author roles in a citation network,” (bachelor degree), September 2019

Daniele Foscarin, “FLAME, clustering tramite l’approssimazione di membership locali,” (bachelor degree), November 2019

Puggina Marco, “Algoritmi di community detection,” (bachelor degree), November 2019

2018

Davide Carta, “Algoritmi di codifica e decodifica per codici Low Density Parity Check,” (bachelor degree), November 2018

Marco Cieno, “ Affinity propagation: clustering tramite scambio di messaggi,” (bachelor degree), September 2018

Marco Calandro, “Analisi dell’algoritmo CPM per l’individuazione di comunitá sovrapposte in reti complesse,” (bachelor degree), September 2018

Francesco Cazzaro, “BigClam algorithm: the study of community detection,” (bachelor degree), July 2018

2017

Anselmo Bettio, “OFDM for wireless communication systems,” (bachelor degree), September 2017

Diego Aghi, “Link prediction in reti bipartite,” (bachelor degree), September 2017

Matteo Zecchin, “Numerical evaluation of coding bounds in the finite-blocklength regime,” (bachelor degree), July 2017

Marco Ceccon, “Graph signal processing: reconstruction algorithms,” (master degree), February 2017

2016

Simone de Vecchi, “Decodifica di codici LDPC con programmazione lineare,” (bachelor degree), July 2016

Nicola Piovesan, “Distributed algorithms for localization in wireless sensor networks,” (master degree), April 2016

2015

Riccardo Gasparetto Stori, “Smart charging scheduling for plug-in electric vehicles,” (master degree), October 2015

2014

Giacomo Da Broi, “Performance evaluation of DVB-S2X over satellite channels,” (master degree), December 2014

Valentina Girotto, “Joint optimization of energy and data buffers in WSNs,” (master degree), October 2014

Gianluca Guerra, “L’algoritmo di Viterbi e sue applicazioni,” (bachelor degree), September 2014

Gianluca Agresti, “L’algoritmo di Viterbi: analisi e simulazione,” (bachelor degree), July 2014

Matteo Dalla Rosa, “Progettazione e sviluppo di un software di comunicazione seriale con modem PLC per applicazioni smart grid,” (bachelor degree), March 2014

2013

Tommaso Martini, “Reed-Solomon codes,” (bachelor degree), July 2013

Davide Merzi, “Progettazione e configurazione di una rete LAN aziendale,” (bachelor degree), July 2013

Riccardo Pollis, “Decodifica di codici LPDC con tecniche di programmazione lineare,” (master degree), April 2013

2012

Alessandro Biral, “Ottimizzazione nelle smart grid: soluzione centralizzata e distribuita,” (master degree), December 2012

Claudio Codemo, “Ottimizzazione dell’energy storage per applicazioni smart grid,” (master degree), October 2012

Paolo Conte, “Sviluppo e implementazione di uno stack protocollare per smart grid,” (master degree), 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,” (bachelor degree), July 2012

Michele Tasca, “Power line communications per smart grids: studio e test su rete artificiale,” (master degree), April 2012

Massimo Gallina, “Sincronizzazione tra dispositivi su power line communications per smart grid,” (master degree), April 2012

Marco Migliorini, “Smart grid: sistemi di controllo, sistemi di sicurezza e mercato dell’energia,” (master degree), April 2012

Francesco Trentini, “Power line communications: an implementation of a real-time control architecture for smart-grid,” (master degree, co-supervisor), April 2012

Andrea Vico, “Localizzazione tramite UWB,” (bachelor degree), February 2012

Pietro Danzi, “Smart grid e PLC: TOA ranging,” (bachelor degree), February 2012

2011

Paolo Rossignoli, “Ranging per smart grid,” (bachelor degree), November 2011

Simone Salvaro, “Misure di ranging per smart grid,” (bachelor degree), September 2011

Roberto Francescon, “Protocolli powerline communications per applicazioni smart grid,” (bachelor degree), September 2011

Stefano Fie, “Metodi di ottimizzazione vincolata per smart grids,” (master degree), July 2011

Francesco Lorenzon, “Tecniche di ranging su sistemi wireless UWB e wired PLC,” (master degree), July 2011

Alberto Gambarucci, “Sviluppo ed utilizzo di GNU/Linux nei sistemi embedded,” (bachelor degree), 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,” (bachelor degree), 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,” (bachelor degree), February 2010

2009

Filippo Nicoletti, “Codifica e decodifica di un codice a barre Datamatrix ECC200,” (bachelor degree), November 2009

Nicola Anselmi, “Analisi per l’implementazione digitale di un ricevitore UWB,” (bachelor degree), November 2009

Nicolò Michelusi, “Semi-blind channel estimation for LTE downlink,” (master degree), July 2009

Giuliano Leoni, “Localizzazione cooperativa mediante time of arrival in IEEE 802.15.4A,” (master degree), April 2009

Francesco Lorenzon, “Sviluppo su FPGA di un algoritmo di ricezione per sistemi UWB,” (bachelor degree), February 2009

2008

Davide Bacco, “Analisi ed elaborazione di flussi DVB,” (bachelor degree), November 2008

Enrico Ballarin, “Analisi ed elaborazione di flussi DVB,” (bachelor degree), November 2008

Sebastiano Zaniol, “Applicazioni per la gestione del ciclo di vita del software in sistemi Z/OS,” (master degree), October 2008

Marco Pengo, “TETRA: studio dello standard, analisi di radiocopertura e di un progetto esecutivo,” (master degree), July 2008

Lobba Marco, “Progetto di un interfaccia per il portocollo ECMA 369,” (master degree), July 2008

2007

Diego Mastrotto, “Progettazione e sviluppo modulo di acquisizione dati con gestione remota attraverso le reti GSM, GPRS e GPS,” (master degree), September 2007

Luca Canzian, “Single acknowledgement system for Bluetooth multicast,” (master degree), July 2007

Manuel Cecchinato, “Enhanced demodulation for EDR Bluetooth systems,” (master degree), July 2007

Mattia Battistello, “Implementazione di un demultiplexer di transport stream MPEG2 per la distribuzione di servizi DVB-IPI,” (master degree), June 2007

Luca Cenzato, “Implementazione FPGA di un modulatore ECMA 368,” (master degree), March 2007

Matteo Curto, “Realizzazione di un sistema di demultiplexing di un transport stream MPEG2 per la distribuzione su rete IP (DVB-IPI),” (master degree), February 2007

Dario Locci, “Sviluppo su FPGA di un filtro di canale a banda variabile per il DVB,” (master degree), February 2007

2006

Luca Bulegato, “Sviluppo e analisi di un sistema per la gestione di una flotta di autoveicoli: postazione mobile,” (master degree), December 2006

Tommaso Baù, “Sviluppo e analisi di un sistema per la gestione di una flotta di autoveicoli: centrale operativa,” (master degree), December 2006

Mosè Zago, “Sicurezza delle reti,” (bachelor degree), October 2006

Valentina Rizzi, “Packet detection and frame timing acquisition in UWB MB-OFDM systems,” (master degree, co-supervisor), October 2006

Luca Aldegheri, “Progetto e sviluppo su FPGA di un modulatore ECMA 368,” (master degree), October 2006

Giuliano Leoni, “Analisi dello standard ECMA-368 High Rate Ultra Wide Band,” (bachelor degree), July 2006

Marco Pain, “Tecniche di localizzazione per sistemi UWB,” (bachelor degree), July 2006

Tiziano Barbiero, “Analisi ed implementazione di un linearizzatore per laser a semiconduttore,” (master degree), April 2006

Marco Boscardin, ‘Sviluppo di un sistema per lo streaming in real-time di servizi DVB su rete LAN,” (master degree), April 2006

Alessandro Contarini, “Progetto di rete IP per la distribuzione locale di servizi DVB,” (master degree), April 2006

Carlo Foscarini, “Progetto di un transcodificatore MPEG2 - H.264 a bassa complessità,” (master degree), April 2006

Alessandro Scibilia, “Distribuzione di servizi DVB-IPI: analisi ed implementazione degli stadi di acquisizione e demultiplexing del Transport Stream,” (master degree), April 2006

Tommaso Pepi, “Progetto e sviluppo su FPGA di un modulatore per sistemi multiband OFDM,” (master degree), March 2006

2005

Luigi Iurlaro, “Realizzazione di un sistema client/server per lo streaming real time di servizi DVB,” (bachelor degree), November 2005

Marco Pengo, “IEEE 802.15.3, Il nuovo protocollo high-rate per le reti WLAN,” (bachelor degree), September 2005

Sebastiano Zaniol, “IEEE 802.15.4, Il nuovo protocollo low-rate per le reti WLAN,” (bachelor degree), September 2005

Matteo Silvestrin, “Implementazione e realizzazione di un compensatore per trasmissioni analogiche e digitali su fibra ottica,” (master degree), May 2005

Carlo di Pietrantonio, “Implementazione su DSP del decodificatore H.264 (main profile) per broadcast TV,” (bachelor degree), April 2005

Francesco Pace, “Distribuzione di servizi tramite reti IP: implementazione dei protocolli RTP/RTPC su piattaforma ARM,” (master degree), March 2005.

Pierluigi Budel, “Progetto di una piattaforma DVB-T per la consultazione remota,” (master degree), March 2005.

Michele Da Rold, “Distribuzione di servizi DVB tramite reti IP: implementazione di una piattaforma Linux Embedded per l’incapsulamento,” (master degree), March 2005.

Francesco Michelin, “Implementazione su FPGA dello stadio di modulazione per il DVB-C,” (master degree), March 2005.

Walter Lancerin, “Riduzione delle distorsioni non lineari generate da un laser nella trasmissione analogica su fibra ottica: teoria ed implementazione,” (master degree), February 2005.

2004

Andrea Francescato, “Analisi e implementazione di un compensatore per la trasmissione di segnali analogici e digitali su fibra ottica,” (master degree), December 2004

Gabriele Siviero, “Studio e simulazione di un sistema di codifica H.264,” (master degree), December 2004

Stefano Ranzato, “Stima ML del canale multipath in sistemi UWB impulse radio,” (master degree), November 2004.

Michele Vicentini, “Codifica Inter con predizione del moto tramite standard H.264,” (bachelor degree), October 2004

Luca Bulegato, “Studio della modalità di codifica untraframe nel nuovo standard H.264/MPEG-4 AVC,” (bachelor degree), September 2004

Tommaso Baù, “Studio ed implementazione dello stadio DCT per H.264/MPEG-4 AVC,” (bachelor degree), September 2004

Marco Poletto, “Studio ed implementazione di un codificatore di Reed-Solomon per il DVB,” (bachelor degree), September 2004

Matteo Toscan, “Implementazione su FPGA dello stadio di pre-modulazione per il DVB,” (master degree), July 2004

Federica Docali, “Un nuovo metodo di stima dicanale per sistemi UWB Impulse-Radio,” (master degree), April 2004

Luca Maschietto, “Sviluppo ed implementazione di uno strato MAC per reti UWB ad-hoc,” (master degree), April 2004

Filippo Pozzato, “Strategie MAC in reti UWB ad-hoc: analisi e simulazione,” (master degree), April 2004

Pietro Nicoletti, “Tecniche di Power Control e loro applicazione in reti ad-hoc di tipo Ultra-Wide-Band,” (master degree), February 2004

Andrea Sivieri, “Strategie di power control in reti ad-hoc di tipo ultra-wide-band: analisi e simulazioni,” (master degree, co-supervisor), February 2004

2003

Bruno Bonomini, “Analisi e sviluppo di una piattaforma per l’incapsulamento e la trasmissione dei servizi DVB su IP,” (master degree, co-supervisor), July 2003

Simone Carnielli, “Studio analitico/simulativo di acquisizione e tracking con criterio ML per trasmissioni UWB,” (master degree, co-supervisor), April 2003

Luca Pilosio, “Realizzazione del modulatore QAM per DVB-C su piattaforma FPGA,” (master degree, co-supervisor), April 2003

Sebastian Longo, “Analisi ed implementazione di un modulatore QAM secondo lo standard DVB-C,” (master degree, co-supervisor), April 2003

Davide Cazzola, “Distribuzione di segnali multimediali su WLAN IEEE802.11b,” (master degree, co-supervisor), March 2003

Enrico Perini, “Analisi della sincronizzazione per sistemi UWB attraverso il criterio di Maximum Likelihood,” (master degree, co-supervisor), March 2003

2002

Claudiu Popa, “Studio, implementazione e test di un incapsulatore DVB su IP per applicazioni Wireless LAN ,” (master degree, co-supervisor), December 2002

Matteo Tamiazzo, “Ottimizzazione delle strategie di rete nello standard DVB-Return Channel,” (master degree, co-supervisor), July 2002

Antonio Piazza, “Analisi delle problematiche di coesistenza nelle reti Indorr Wireless LANs,” (master degree, co-supervisor), June 2002

2001

Gabriele Donà, “Early-Late Tracking per sistemi UWB Impulse Radio,” (master degree, co-supervisor), December 2001

Alessandro Ravagnin, “Modellizzazione dell’interferenza di intercanale nei sistemi Impulse Radio,” (master degree, co-supervisor), December 2001

Nicola Bramante, “Applicazione di metodi di codifica caotica ai sistemi Impulse Radio,” (master degree, co-supervisor), December 2001

Davide Prando, “A novel method for motion estimation using phase correlation,” (master degree, co-supervisor), July 2001

2000

Demetrio Scarfone, “Cinema elettronico e sua distribuzione via satellite,” (master degree, co-supervisor), December 2000

Giovanni Chierico, “Joint phase and timing recovery in a DVB satellite system,” (master degree, co-supervisor), March 2000

Francesco De Pellegrini, “Acquisizione congiunta del sincronismo di tempo e frequenze per un sistema DVB su canale terrestre,” (master degree, 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,” (master degree, co-supervisor), March 2000

1999

Alex Siega, “Modellizzazione e recupero mediante PLL del rumore di fase in un sistema DVB satellitare,” (master degree, co-supervisor), December 1999

Fabio Favaretto, “Recupero dell’offset di frequenza in un sistema DVB satellitare usando algoritmi AFC e PLL in serie,” (master degree, co-supervisor), December 1999

Padova, June 3, 2025

Tutto quanto dichiarato nel presente CV corrisponde a verità, ai sensi degli articoli 46 e 47 del D.P.R. 445 del 2000