

Curriculum Vitae

Marco Dalai

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BRIEF CV

Marco Dalai was born in 1979 in Manerbio (BS), Italy. He received the Dr. Eng. degree (“laurea V.O.”) cum laude in Electronic Engineering from the University of Brescia, Italy, in 2003. His thesis was awarded the Informatica Delta – Inntech Award for the best theses in Electronic Engineering in 2002/2003. He obtained the PhD in Information Engineering in 2007, under the supervision of prof. Riccardo Leonardi, from the University of Brescia. In 2005 he has been a visiting student at the Imperial College of London under the supervision of Pier Luigi Dragotti.

Since May 2008, he has been an assistant professor in Telecommunications (ING-INF/03) in the Department of Information Engineering (confirmed in 2011), University of Brescia.

Marco Dalai is a member of IEEE Information Theory Society. His research interests include information theory, signal processing, image and video coding, statistical inference and learning. He participated in national and international research projects and serves as a reviewer for several journals. He is the recipient of the 2014 IEEE Information Theory Society Paper Award. He was a “long-term participant” of the Information Theory program organized between Jan. and May 2015 at the Simons Institute for the Theory of Computing, University of California at Berkeley, CA.

PUBLICATIONS

Journal Papers

- M. Dalai, "Elias Bound for General Distances and Stable Sets in Edge-Weighted Graphs", *IEEE Trans. Inform. Theory*, vol. 61(5), pp. 2335-2350, May 2015.
- A. Degani, M. Dalai, R. Leonardi, P. Migliorati, "Comparison of tuning frequency estimation methods", *Multimedia Tools and Applications*, vol. 74(15), pp. 5917--5934, Jul. 2015.
- M. Dalai, "Lower Bounds to the Probability of Error for Classical and Classical-Quantum channels", *IEEE Trans. Inform. Theory*, vol. 59(12), pp. 8027-8056, Dec. 2013.
- L. Lima, M. Dalai, R. Leonardi, P. Migliorati, R. Bernardini and R. Rinaldo, "Optimal rate allocation for P2P video streaming", *IEEE Journal on Selected Areas in Communications*, vol. 31, n. 9, pp. 200-213, Sept. 2013.
- M. Dalai. How would Riemann evaluate $\zeta(2n)$?. *American Mathematical Monthly, The American Mathematical Monthly*, Vol. 120, No. 2, pp. 169-171, Feb. 2013.
- M. Dalai and R. Leonardi. On Unique Decodability. *IEEE Trans. on Inform. Theory*, vol. 54(11), pp. 5068-5072, Nov. 2008.
- M. Dalai, E. Weyer and M.C. Campi. Parameter Identification for Nonlinear Systems: Guaranteed Confidence regions through LSCR. *Automatica*, vol. 43, n. 8, pp. 1418-1425, August 2007.
- M. Dalai and R. Leonardi. Approximations of One-Dimensional Digital Signals under the l-infinity Norm. *IEEE Trans. on Signal Processing*, vol. 54(8), pp. 3111-3124, Aug. 2006.
- M. Dalai. Recurrence Relations for the Lerch Phi functions and applications. *Z. Anal. Anwend.* 24, no. 4, 895-908, 2005.

Book Chapters

- M. Dalai and R. Leonardi. Video Compression for Camera Networks: A Distributed Approach. In *Multicamera Networks: Concepts and Applications (part III)*, pp. 267-294, 2009.
- C. Tonoli and M. Dalai. Coherent Video Reconstruction with Motion Estimation at the Decoder. Accettato per inclusione in *Analysis, Retrieval and Delivery of Multimedia Contents*, in fase di stampa - 2011.

Conference Papers

- R. Devassy, G. Durisi, B. Lindqvist, W. Yang, M. Dalai, "Nonasymptotic coding-rate bounds for binary erasure channels with feedback", in Proc. 2016 IEEE Information Theory Workshop (ITW), pp.86-90, Cambridge, U.K., Sep. 2016.
- M. Dalai, Y. Polyanskiy, "Bounds on the Reliability of a Typewriter Channel," in Proc. IEEE International Symposium on Information Theory (ISIT 2016), pp.1715-1719, Barcelona, Spain, 10-15 Jul 2016.
- D. Cullina, M. Dalai, Y. Polyanskiy, "Rate-distance tradeoff for codes above graph capacity," in Proc. IEEE International Symposium on Information Theory (ISIT 2016), pp.1331-1335, Barcelona, Spain, 10-15 Jul 2016.
- A. Degani, M. Dalai, R. Leonardi, P. Migliorati, "Harmonic Change Detection for musical chords segmentation," in Proc. 2015 IEEE International Conference on Multimedia and Expo (ICME), vol., no., pp.1-6, June 29 2015-July 3 2015.
- A. Martinez, J. Scarlett, M. Dalai, and A. Guillén i Fàbregas, "A complex-integration approach to the saddlepoint approximation for random-coding bounds", *2014 International Symposium on Wireless Communications Systems*, Barcelona, Aug. 2014.
- M. Dalai and A. Winter, "Constant Compositions in the Sphere Packing Bound for Classical-Quantum Channels", in *Proc. IEEE International Symposium on Information Theory (ISIT 2014)*, Honolulu, HI, USA.
- M. Dalai, "An Elias Bound on the Bhattacharyya Distance of Codes for Channels with a Zero-Error Capacity", in *Proc. IEEE International Symposium on Information Theory (ISIT 2014)*, Honolulu, HI, USA.
- A. Degani, M. Dalai, R. Leonardi and P. Migliorati, "Time-Frequency Analysis of Musical Signals Using the Phase Coherence", DAFx 2013.
- A. Degani, M. Dalai, R. Leonardi and P. Migliorati, "A Heuristic for Distance Fusion in Cover Song Identification", WIAMIS 2013.
- A. Degani, M. Dalai, R. Leonardi and P. Migliorati, "Real-Time Performance Comparison of Tuning Frequency Estimation Algorithms", ISPA 2013.
- M. Dalai, "Lovász's Theta Function, Rényi's Divergence and the Sphere-Packing Bound", in *Proc. IEEE International Symposium on Information Theory (ISIT 2013)*, Istanbul, Turkey.
- M. Dalai, "An ``Umbrella" Bound of the Lovász-Gallager Type", in *Proc. IEEE International Symposium on Information Theory (ISIT 2013)*, Istanbul, Turkey.
- L. Lima, M. Dalai, P. Migliorati and R. Leonardi, "Optimal overlay generation for P2P video streaming applications", in *Proc. International Symposium on Communications Control and Signal Processing (ISCCSP), 2012*, Rome, Italy, 2-4 May 2012.
- L. Lima, M. Dalai, P. Migliorati and R. Leonardi, "Overlay optimization in push-based networks for P2P scalable video streaming", in *Proc. of ICIP 2012*, Orlando, Florida, USA, Sept. 30 2012-Oct. 3, 2012.
- M. Dalai, "Sphere Packing Bound for Quantum Channels", Accepted for inclusion in *Proc. IEEE Intern. Symp. on Inform. Theory (ISIT 2012)*, Boston, MA, USA, July 2012.
- M. Dalai. A new bound for the capacity of the deletion channel with high deletion probabilities. Accettato per pubblicazione in *Proc. IEEE Intern. Symp. on Inform. Theory (ISIT '11)*, July 2011.

- M. Dalai, S. Malavasi and R. Leonardi. Consistent Image Decoding from Multiple Lossy Versions. In *Proc. of the 2010 ACM Multimedia Workshop on Advanced Video Streaming Techniques for Peer-to-Peer Networks and Social Networking*, October 2010.
- C. Tonoli, M. Dalai and R. Leonardi. Coherent Video Reconstruction with Motion Estimation at the Decoder. In *Proc. of the 11th International Workshop on Image Analysis for Multimedia Interactive Services (WIAMIS 2010)*, April 2010.
- M. Dalai and R. Leonardi. Minimal Information Exchange for Image Registration. In *Proc. of the 16th European Signal Processing Conference (EUSIPCO 2008)*, Lausanne, Switzerland, 2008.
- X. Artigas, J. Ascenso, M. Dalai, S. Klomp, D. Kubasov, M. Ouaret. The Discover Codec: Architecture, Techniques And Evaluation. In *Proc. Picture Coding Symposium (PCS'07)*, Lisboa, Portugal, November 2007
- C. Tonoli, M. Dalai, P. Migliorati and R. Leonardi. Error Resilience Performance Evaluation of a Distributed Video Codec. In *Proc. Picture Coding Symposium (PCS'07)*, Lisboa, Portugal, November 2007.
- U. Ciraci, M. Dalai and R. Leonardi. Adaptive Key Frame Rate Allocation For Distributed Video Coding. In *Proc. Picture Coding Symposium (PCS'07)*, Lisboa, Portugal, November 2007.
- M. Dalai, R. Leonardi and P. L. Dragotti. Distributed Coding of Shifts Using the DFT Phase. In *Proc. of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2007)*, Honolulu, Hawaii, April 2007.
- M. Dalai, R. Leonardi and F. Pereira. Improving Turbo Codec Integration In Pixel-Domain Distributed Video Coding. In *Proc. of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2006)*, Toulouse, France, May 2006.
- M. Dalai, R. Leonardi. L-infinity Constrained Approximations for Image and Video Compression. In *Proc. Picture Coding Symposium (PCS'06)*, Beijing, China, April 2006.
- M. Dalai, E. Weyer and M. Campi. Parametric Identification of Nonlinear Systems: Guaranteed Confidence Regions. In *Proc. 44th Conf. on Decision and Control*, Seville, Spain, December 2005.
- M. Dalai, R. Leonardi and P. Migliorati. Efficient digital pre-filtering for least squares linear approximation. In *Proc. 9th International Workshop on Very Low Bit-rate Video (VLBV05)*, Cagliari, Italy, September 2005.
- M. Dalai and R. Leonardi. Non prefix-free codes for constrained sequences. *Proc. of IEEE Intern. Symp. on Inform. Theory (ISIT 2005)*, Adelaide, Australia, September 2005.
- N. Adami, M. Brescianini, M. Dalai, R. Leonardi and A. Signoroni. A fully scalable video coder with inter-scale wavelet prediction and morphological coding. In *Proc. of Visual Communications and Image Processing (VCIP 2005)*, Beijing, China, July 2005.
- M. Dalai and R. Leonardi. Segmentation based image coding with l-infinity norm error control. In *Proc. Picture Coding Symposium (PCS'04)*, San Francisco, USA, December 2004.
- M. Dalai and R. Leonardi. L-infinity norm based second generation image coding. In *Proc. of International Conference on Image Processing (ICIP'04)*, Singapore, October 2004.
- M. Dalai and R. Leonardi. Efficient (piecewise) linear minmax approximation of digital signals. In *Proc. of International Conference on Acoustics, Speech, and Signal Processing (ICASSP'04)*, Montreal, Quebec, Canada, May 2004.

PARTICIPATION IN PROJECTS

- Feb. 2017 – Feb. 2019, PRIN 2015, Limitazioni teoriche per comunicazioni a bassissime probabilità d'errore, Principal Investigator.
- Mar. 2011 – Dec. 2011, FP7-2009-231824 IRIS: Integrating Research in Interactive Storytelling
- Feb. 2010 – Feb. 2012, PRIN 2008 ARACHNE: Advanced Video Streaming Techniques for Peer-to-Peer Video Networks, project funded by the Italian Ministry of Education (MIUR)
- Feb. 2008 – Mar. 2008, FP6-2007-45189 RUSHES: Retrieval of mUltimedia Semamtic units for enHanced rEuSability
- Dec. 2006 – Dec. 2009, DYNAMIC TV, (Multimedia Content Analysis), funded by Telecom Italia
- Mar. 2006 – Mar. 2007, PRIN 2005 Codifica di Informazione Visiva in Modalit`a DSC (Distributed

- Source Coding), project funded by the Italian Ministry of Education (MIUR)
- Sep. 2005 – Oct. 2007, FP6-ISTFET-2005-15314 DISCOVER: Distributed Coding for Video Services

REVIEWING ACTIVITIES

Reviewer for several journals in different areas, among which: Automatica, IEEE Transactions on Circuits and Systems for Video Technology, IEEE Transactions on Communications, IEEE Transactions on Computers, IEEE Transactions on Image Processing, IEEE Transactions on Information Theory, Signal Processing Letters. Reviewer for National Projects PRIN 2010 for the Italian Ministry of Education (MIUR).

TEACHING ACTIVITY

- A.Y. 2015/16--: “Segnali e Sistemi” (9 CFU), C.d.L. in Ingegneria Informatica and C.d.L. in Ingegneria Elettronica e delle Telecomunicazioni, University of Brescia.
- A.Y. 2011/12-2016/17: “Information Theory” (6 CFU), C.d.L. Magistrale in Ingegneria delle Telecomunicazioni and M. Sc. in Communication Technologies And Multimedia, University of Brescia.
- A.Y. 2013/14: "Remote Sensing Data Acquisition" (3CFU), M.Sc. in Communication Technologies And Multimedia, University of Brescia.
- A.Y. 2012/13: "Acquisizione di Dati per il Telerilevamento" (3CFU) C.d.L. Magistrale in Ingegneria delle Telecomunicazioni, University of Brescia.
- A.Y. 2010/11: “Teoria dell’Informazione e Codici” (6 CFU) and “Codifica di Canale Avanzata” (3 CFU) C.d.L. Magistrale in Ingegneria delle Telecomunicazioni, University of Brescia.
- A.Y. 2007/08-2009/10: “Teoria dell’Informazione e della Codifica” (5 CFU), C.d.L. Specialistica in Ingegneria delle Telecomunicazioni, University of Brescia.
- A.Y. 2009/10-2014/2015 : assistant for “Teoria dei Segnali” (5 CFU), C.d.L. in Ingegneria Informatica and C.d.L. in Ingegneria Elettronica e delle Telecomunicazioni, University of Brescia.
- A.Y. 2007/08, 2008/09: assistant for “Comunicazioni Elettriche A” (5 CFU), C.d.L. in Ingegneria dell’Informazione, University of Brescia.
- A.Y. 2008/09-2010/11: assistant for “Trasmissione dei Segnali Multimediali” (5 CFU), C.d.L. Specialistica in Ingegneria delle Telecomunicazioni, University of Brescia.
- A.Y. 2007/08-2009/10: tutor for “Fondamenti di Matematica del Discreto” (6 CFU) C.d.L. On-Line in Sicurezza dei Sistemi e delle Reti Informatiche, University of Milan.
- A. Y. 2009/10, 2010/11: tutore for “Matematica del Discreto” (9 CFU) C.d.L. On-Line in Sicurezza dei Sistemi e delle Reti Informatiche, University of Milan.