europass Curriculum vitae

PERSONAL INFORMATION

Marco Chiani

(Italy)

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WORK EXPERIENCE

2001–Present

Professor

University of Bologna (Italy)

2003–Present

Research Affiliate

MIT (USA)

EDUCATION AND TRAINING

1983–1989

Dr. Ing. Degree in Electronic Engineering

Summa cum laude

University of Bologna (Italy)

1989–1993

PhD, Electronic and Computer Engineering

University of Bologna (Italy)

PERSONAL SKILLS

Mother tongue(s): Italian

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C2	C1	C1	C2

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages

Organisational / managerial skills

Professor Chiani has chaired, organized sessions and served on the Technical Program Committees at several IEEE International Conferences, such as IEEE-ICC 2002 (New York, USA), IEEE-Globecom 2002 (Taipei, Taiwan), UWBST 2003, IEEE-Globecom 2003 (S. Francisco, USA), UWBST&IWUWBS 2004, Japan, IEEE-ICC 2004 (Paris), IEEE-Globecom 2004 (Dallas, USA). He was Co-Chair of the Wireless Communications Symposium at ICC 2004, Co-Chair of PIMRC 2010 (track 3), Co-chair of the IEEE Communication Theory Symposium at ICC 2011, TPC Co-chair of the IEEE Comm. Theory Workshop 2011, general co-chair of IEEE ICUWB 2011, Tutorials Co-Chairs for the 2013 IEEE International Conference on Communications, TPC Co-chair of the IEEE ICC 2016 - Communications Theory Symposium, Track Chair of EUSIPCO 2016, Track Chair of EUSIPCO 2017, TPC Chair of IEEE ISWCS 2017.

He is the past chair (2002–2004) of the Radio Communications Committee of the IEEE Communication Society and past Editor of Wireless Communication (2000–2007) for the journal IEEE Transactions on Communications.

He was/is evaluator for research projects proposals presented for funding to the Research Grants Council, Hong Kong, China.

On invitation, he was a panelist (the only European in the panel) to evaluate, in 2003, research

proposals presented to the USA National Science Foundation (NSF) for the “Wireless & Optical Communications Research Panel”.

He has been (2009-2014) the appointed member for Italy within the COST ICT Domain Committee.

He is an evaluator for research projects for the Italian ministry of research “Ministero dell’Università e della Ricerca Scientifica”.

He served as chair (2013-2014) of the international prize IEEE "Eric E. Sumner Award", assigned for outstanding contributions to communications technology.

He served as chair (2016-2017) of the international prize IEEE "Kiyo Tomiyasu Award", assigned to recognize outstanding early to mid-career contributions to technologies holding the promise of innovative applications.

He served in the internal evaluation committee for funding industrial experiments within the European project EuroCPS (H2020) on Cyber-Physical Systems.

ADDITIONAL INFORMATION

Honours and awards

- IEEE Fellow for “Contributions to wireless communication systems”
- The 2012 IEEE Communications Society Fred W. Ellersick Prize for to the best article published in a Communications Society magazine
- The 2012 IEEE Communications Society Stephen O. Rice Prize in the Field of Communications Theory
- Distinguished Visiting Fellow of the Royal Academy of Engineering, UK, 2012.
- Distinguished Lecturer, IEEE COMSOC, 2011-2013.
- The 2011 Leonard G. Abraham Prize in the Field of Communications Systems from the IEEE Communications Society.
- ICNEWS award, “For Fundamental Contributions to the Theory and Practice of Wireless Communications”
- Outstanding Service Award, 2008 IEEE ComSoc Radio Communications Committee
- Best Paper Award, IEEE ICC2008
- Best Paper Award, 2007 IST Mobile & Wireless Communication Summit
- Best Paper Award, IEEE ICC2008, IWCMC 2006.
- Technical Recognition Award, 2010, IEEE COMSOC Radio Communications Committee for “Contributions to high-spectral efficiency wireless communications”.

KEYNOTE, INVITED TALKS, TUTORIALS

· “Recent Results on the Eigenvalues Distribution for Finite Random Matrices,” Workshop on Random Matrices EurAsia-2017, School of Mathematics, Fudan University, Shanghai, PR China, 2017, Invited Talk.

· “Recent Results on the Eigenvalues of Random Matrices with Application to Wireless Communications and to MANOVA,” London, UK, University College, Feb. 2014, Invited Talk.

· “The marriage between random access and codes on graphs: Coded slotted ALOHA,” Rome, Italy, IEEE First AESS European Conference on Satellite Telecommunications, Oct. 2012, Invited Talk.

· “Fundamental limits of energy in communication,” Bertinoro, Italy, SINANO Device Modelling Summer School, Aug. 2012, Invited Lecture.

· “The marriage between random access and codes on graphs: Coded slotted ALOHA,” Gothenburg, Sweden, International Symposium on Turbo Codes and Iterative Information Processing, Aug. 2012, Invited Talk.

· "The marriage between random access and codes on graphs: Coded slotted ALOHA does not need retransmissions," Paris, France, SUPELEC, Nov. 2011, Invited Talk.

· "The marriage between random access and LDPC: Coded slotted ALOHA does not need retransmissions," Palermo, Italy, 50th Federation of Telecommunications Engineers of the European Union International Conference (FITCE 2011), Sep. 2011, Keynote Speech.

· "Is correlation always optimal for detection in Gaussian channels? Is it always convenient to have a large number of antennas in MIMO?" Christchurch, New Zealand, Australian Communications Theory Work- shop (AusCTW 2008), Jan. 2008, Keynote Speech.

· "Recent results on the eigenvalues of random matrices with application to wireless communication systems," Zurich, Switzerland, 6th International Congress on Industrial and Applied Mathematics (ICIAM07), Jul. 2007, Mini symposium on applications of random matrices to physics and engineering, Invited Talk.

· "From adaptive radio to cognitive radio: the role of UWB," Dhaka, Bangladesh, IEEE International Conference on Next-Generation Wireless Systems (ICNEWS06), Jan. 2006, Keynote Speech.

· "Recent results on MIMO systems: Capacity and error probability," Hong Kong University, Hong Kong, Tech. Rep., Jun. 2005, Invited Talk.

· "Recent results on MIMO systems: Capacity and error probability," Applied Science and Technology Institute (ASTRI), Hong Kong, Tech. Rep., Jun. 2005, Invited Talk.

· "UWB and 'the others': coexistence or war?" Milan, ITALY, Italian Association for Information and Communications Tecnologies (AICT), Jan. 2005, Invited Panel.

· "Recent results on MIMO systems: Capacity and error probability," University of Arizona, Tucson, AZ, Tech. Rep., Dec. 2004, Invited Talk.

· "How eigenvalues of random matrices can be used to solve problems in wireless communications," Providence, RI, MathFest, Aug. 2004, Invited Lecture.

· "Low-Density Parity-Check Codes for high rate multimedia communications," Oulu, Finland, VTT Electronics Sixth annual seminar in Telecommunication Systems, Sep. 2004, Invited Plenary Presentation.

· "Low-Density Parity-Check Codes for space applications," Munich, D, Institute for Communications and Navigation - DLR (German Aerospace Centre), Feb. 2004, Invited Talk.

· "Multiple antennas & low-density parity check codes: UWB range extension," Seoul, KOREA, Korea Electronics Technology Institute, Ministry of Commerce, Industry, and Energy, Dec. 2002, Invited Talk.

· "Performance of codes over block fading channels," Middletown, NJ, AT&T Research, Sep. 2001, Invited Talk.

· "Multiple antenna systems from optimum combining to MIMO networks: a random matrix theory approach," Firenze, Future Network & Mobile Summit 2010, Jun. 2010, Tutorial.

· "Multiple antenna from optimum combining to MIMO: Random matrix theory analysis," Honolulu, Proc. IEEE Global Telecomm. Conf., Dec. 2009, Tutorial.

· "Multiple antenna from optimum combining to MIMO: a random matrix theory approach," Dresded, Proc. IEEE Int. Conf. on Commun., Jun. 2009, Tutorial.

· "Multiple antenna from optimum combining to MIMO: an approach based on random matrix theory," New Orleans, Proc. IEEE Global Telecomm. Conf., Dec. 2008, Tutorial.

· "Multiple antenna systems for interference mitigation and throughput enhancement," Orlando, FL, Proc. Military Commun. Conf., Oct. 2007, Tutorial.

· "Multiple antenna from optimum combining to MIMO: an approach based on random matrix theory," San Francisco, Proc. IEEE Global Telecomm. Conf., Nov. 2006, Tutorial.

· "Finite and infinite random matrix theory," Philadelphia, PA, IEEE International Conference on Acoustic, Speech, and Signal Processing, Mar. 2005, Tutorial.

· "Interference in Wireless Cellular Systems: characterization and performance with Slow Frequency Hopping," Atlantic City, USA, IEEE Vehicular Technology Conf., Oct. 2001, Tutorial.

SOME RECENT RESEARCH PROJECTS

His research interests include wireless networks, wireless communication and localization systems, MIMO systems, wireless multimedia, error correcting codes, cognitive radio and UWB.

He currently leads the research unit of the University of Bologna as responsible for the first funded

industrial experiment for the European H2020 project EuroCPS.

He is a consultant to the European Space Agency (ESA-ESOC) for the design and evaluation of error correcting codes based on LDPCC for space CCSDS applications.

He led the research unit of the University of Bologna/CNIT in the following European projects:

- European H2020 project EuroCPS (on Cyber-Physical Systems)
- European FP7 project COEXIST (on cognitive radio)
- European FP7 project EUWB (on UWB communication and localization)
- European FP7 project Concerto (on wireless video)
- European FP7 project Optimix (on wireless video)
- European FP6 project Phoenix (on wireless video)

Publications

Prof. Chiani has published more than 300 papers in international journals and conferences in wireless communications field with special emphasis on: Theoretical (Shannon) capacity of multiple input multiple output (MIMO) wireless communication systems; analysis of the distribution of Wishart random matrices; statistical distribution of the eigenvalues for uncorrelated and correlated Wishart matrices, and applications to wireless communication systems; design and analysis of low-density parity-check codes (LDPCC) for terrestrial and space applications; ultra Wide Bandwidth communication and localization systems (UWB); joint source and channel coding/decoding for wireless multimedia communication; statistical signal processing for Cyber-Physical Systems.

Some recent journal papers

[1] M. Chiani, “On the probability that all eigenvalues of Gaussian, Wishart, and double Wishart random matrices lie within an interval,” IEEE Trans- actions on Information Theory, vol. 63, no. 7, pp. 4521–4531, Jul 2017.

[2] S. Cicalò, M. Mazzotti, S. Moretti, V. Tralli, and M. Chiani, “Multiple video delivery in m-Health emergency applications,” IEEE Transactions on Multimedia, vol. 18, no. 10, pp. 1988–2001, Oct 2016.

[3] A. Giorgetti, M. Lucchi, E. Tavelli, M. Barla, G. Gigli, N. Casagli, M. Chiani, and D. Dardari, “A robust wireless sensor network for landslide risk analysis: System design, deployment, and field testing,” IEEE Sensors Journal, vol. 16, no. 16, pp. 6374–6386, Aug 2016.

[4] B. Sobhani, T. Zwick, and M. Chiani, “Target TOA association with the Hough Transform in UWB Radars,” IEEE Transactions on Aerospace and Electronic Systems, vol. 52, no. 2, pp. 743–754, April 2016.

[5] E. Paolini, G. Liva, and M. Chiani, “Coded slotted ALOHA: A graph- based method for uncoordinated multiple access,” IEEE Trans. Inform. Theory, vol. 61, no. 12, pp. 6815–6832, Dec 2015.

[6] M. Chiani, “Distribution of the largest root of a matrix for Roy’s test in multivariate analysis of variance,” Journal of Multivariate Analysis, vol. 143, pp. 467–471, 2016, also in arxiv, 2014.

[7] G. Pasolini, E. Paolini, D. Dardari, and M. Chiani, “Experimental results on secret-key extraction from unsynchronized UWB channel observations,” in Physical and Data-Link Security Techniques for Future Communication Systems, ser. Lecture Notes in Electrical Engineering, M. Baldi and S. Tomasin, Eds. Springer International Publishing, 2016, vol. 358, pp. 111–124.

[8] A. Mariani, A. Giorgetti, and M. Chiani, “Wideband spectrum sensing by model order selection,” IEEE Trans. Wireless Commun., vol. 14, no. 12, pp. 6710–6721, Dec 2015.

[9] ——, “Model order selection based on information theoretic criteria: Design of the penalty,” IEEE Trans. Signal Processing, vol. 63, no. 11, pp. 2779–2789, June 2015.

[10] N. Decarli, A. Giorgetti, D. Dardari, M. Chiani, and M. Z. Win, “Stop- and-go receivers for non-coherent impulse communications,” IEEE Trans. Wireless Commun., vol. 13, no. 9, pp. 4821–4835, Sep. 2014.

[11] G. Liva, E. Paolini, and M. Chiani, “On optimum decoding of certain product codes,” IEEE

Commun. Lett., vol. 18, no. 6, pp. 905–908, June 2014.

[12] M. Chiani, “Distribution of the largest eigenvalue for real Wishart and Gaussian random matrices and a simple approximation for the Tracy- Widom distribution,” Journal of Multivariate Analysis, vol. 129, pp. 69 – 81, 2014.

[13] B. Sobhani, E. Paolini, A. Giorgetti, M. Mazzotti, and M. Chiani, “Target tracking for UWB multistatic radar sensor networks,” Selected Topics in Signal Processing, IEEE Journal of, vol. 8, no. 1, pp. 125–136, Feb 2014.

[14] P. J. Smith, P. A. Dmochowski, M. Chiani, and A. Giorgetti, “On the number of independent channels in multi-antenna systems,” IEEE Trans. on Wireless Comm., vol. 13, no. 1, pp. 75–85, 2014.

[15] B. Matuz, G. Liva, E. Paolini, M. Chiani, and G. Bauch, “Low-rate non- binary LDPC codes for coherent and blockwise non-coherent AWGN chan- nels,” IEEE Transactions on Communications, vol. 61, no. 10, pp. 4096– 4107, October 2013.

[16] M. F. Flanagan, E. Paolini, M. Chiani, and M. P. C. Fossorier, “Spectral shape of doubly-generalized LDPC codes: Efficient and exact evaluation,” IEEE Transactions on Information Theory, vol. 59, no. 11, pp. 7212–7228, Nov 2013.

[17] G. Liva, P. Pulini, and M. Chiani, “On-line construction of irregular repeat accumulate codes for packet erasure channels,” Wireless Communications, IEEE Transactions on, vol. 12, no. 2, pp. 680–689, February 2013.

[18] P. Pulini, G. Liva, and M. Chiani, “Unequal diversity LDPC codes for relay channels,” Wireless Communications, IEEE Transactions on, vol. 12, no. 11, pp. 5646–5655, November 2013.

[19] G. Liva, E. Paolini, B. Matuz, S. Scalise, and M. Chiani, “Short turbo codes over high order fields,” IEEE Trans. Commun., vol. 61, no. 6, pp. 2201–2211, June 2013.

[20] G. Liva, E. Paolini, and M. Chiani, “Bounds on the error probability of block codes over the q-ary erasure channel,” IEEE Trans. Commun., vol. 61, no. 6, pp. 2156–2165, June 2013.

[21] A. Giorgetti and M. Chiani, “Time-of-arrival estimation based on information theoretic criteria,” IEEE Trans. Signal Processing, vol. 61, no. 8, pp. 1869–1879, April 2013.

[22] A. Zanella and M. Chiani, “Reduced complexity power allocation strategies for MIMO systems with singular value decomposition,” IEEE Trans. Veh. Technol., vol. 61, no. 9, pp. 4031 –4041, nov. 2012.

[23] E. Paolini, G. Liva, B. Matuz, and M. Chiani, “Maximum likelihood erasure decoding of LDPC codes: Pivoting algorithms and code design,” IEEE Trans. Commun., vol. 60, no. 11, pp. 3209–3220, November 2012.

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[25] M. Mazzotti, S. Moretti, and M. Chiani, “Multiuser resource allocation with adaptive modulation and LDPC coding for heterogeneous trac in OFDMA downlink,” IEEE Trans. Commun., vol. 60, no. 10, pp. 2915 –2925, october 2012.

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[29] ——, Mobile Communications Handbook, Third Edition. CRC Press, 2012, ch. 17. High-Throughput MIMO Systems, pp. 313–332. [Online]. Available: http://dx.doi.org/10.1201/b12494-18

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[31] E. Paolini, M. Chiani, and M. Fossorier, “Degree distribution design for LDPC codes: A derivative matching approach,” IEEE Trans. Commun., vol. 59, no. 11, pp. 3007–3015, Nov. 2011.

[32] V. Tralli, A. Conti, and M. Chiani, “Pragmatic space-time trellis codes: GTF-based design for block fading channels,” IEEE Trans. Signal Pro- cessing, vol. 59, no. 6, pp. 2809–2823, Jun. 2011.

[33] A. Giorgetti, M. Lucchi, M. Chiani, and M. Z. Win, “Throughput per pass for data aggregation from a wireless sensor network via a UAV,” IEEE Trans. Aerospace and Electronic Systems, vol. 47,

no. 4, pp. 2610–2626, Oct. 2011.

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[37] T. Q. S. Quek, M. Z. Win, and M. Chiani, “Robust power allocation of wireless relay channels,” IEEE Trans. Commun., vol. 58, no. 7, pp. 1931–1938, Jul. 2010.

[38] A. Zanella, M. Chiani, and M. Z. Win, “The effect of unequal power reception in cellular MIMO networks,” Signal Processing, vol. 90, no. 6, pp. 1850–1860, Jun. 2010.

[39] M. Chiani, “Noncoherent frame synchronization,” IEEE Trans. Commun., vol. 58, no. 5, pp. 1536 –1545, May 2010.

[40] G. Liva, B. Matuz, E. Paolini, and M. Chiani, “Achieving a near-optimum erasure correction performance with low-complexity LDPC codes,” Inter- national Journal of Satellite Communications and Networking, vol. 28, pp. 236–256, Jul. 2010, 10.1002/sat.961.

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[46] E. Paolini and M. Chiani, “Construction of near-optimum burst erasure correcting Low-Density Parity-Check codes,” IEEE Trans. Commun., vol. 57, no. 5, pp. 1320–1328, May 2009.

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correlated MIMO channels," IEEE Trans. Wireless Commun., vol. 7, no. 2, pp. 562–573, Feb. 2008.

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[61] M. Lucchi, A. Giorgetti, M. Z. Win, and M. Chiani, "Using a UAV to collect data from low-power wireless sensors," Aerotecnica Missili e Spazio, Journal of the Associazione Italiana di Aeronautica e Astronau- tica (AIDAA), vol. 86, no. 3, pp. 141–150, Jul./Sep. 2007.

[62] A. Conti, M. Z. Win, and M. Chiani, "Slow adaptive M-QAM with diversity in fast fading and shadowing," IEEE Trans. Commun., vol. 55, no. 5, pp. 895–905, May 2007.

[63] M. Chiani, F. Chiaraluce, and R. Garello, "Guest Editorial: Channel coding in wireless systems," Journal of Comm. Software and Systems (JCOMSS/IEEE), vol. 2, no. 3, pp. 177–178, Sep. 2006.

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[65] M. Chiani and M. G. Martini, "On sequential frame synchronization in AWGN channels," IEEE Trans. Commun., vol. 54, no. 2, pp. 339–348, Feb. 2006.

[66] A. Giorgetti, M. Chiani, and M. Z. Win, "The effect of narrowband interference on wideband wireless communication systems," IEEE Trans. Commun., vol. 53, no. 12, pp. 2139–2149, Dec. 2005.

[67] A. Conti, M. Z. Win, and M. Chiani, "Invertible bounds for M-QAM in fading channels," IEEE Trans. Wireless Commun., vol. 4, no. 5, pp. 1994–2000, Sep. 2005.

[68] W. M. Gi↵ord, M. Z. Win, and M. Chiani, "Diversity with practical channel estimation," IEEE Trans. Wireless Commun., vol. 4, no. 4, pp. 1935– 1947, Jul. 2005.

[69] M. Chiani and M. G. Martini, "Practical frame synchronization for data with unknown distribution on AWGN channels," IEEE Commun. Lett., vol. 9, no. 5, pp. 456–458, May 2005.

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[79] ——, "On the capacity of spatially correlated MIMO Rayleigh fading channels," IEEE Trans. Inform. Theory, vol. 49, no. 10, pp. 2363–2371, Oct. 2003.

[80] M. Chiani, D. Dardari, and M. K. Simon, “New exponential bounds and approximations for the computation of error probability in fading chan- nels,” IEEE Trans. Wireless Commun., vol. 2, no. 4, pp. 840 – 845, Jul. 2003.

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