

## **Giordano Spadacini, Ph.D.**

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### Resume

Giordano Spadacini received the Laurea (Master) and the Ph.D. degrees in Electrical Engineering from Politecnico di Milano, Milan, Italy, in 2001 and 2005, respectively.

From April 2005 to October 2007 he was a Research Assistant, from November 2007 to September 2018 he was an Assistant Professor, and since October 2018 he is an Associate Professor with the Department of Electronics, Information and Bioengineering (DEIB), Electrical Engineering Section, Politecnico di Milano.

His research interests are in the field of Electromagnetic Compatibility (EMC), and include the characterization of interference effects, modeling of distributed-parameter circuits, statistical techniques for EMC, innovative experimental procedures and setups for EMC testing, and EMC in aerospace and railway systems.

He published over 90 scientific papers in international journals and in conference proceedings.

### Recognitions and Awards

- 2016 Richard B. Schulz Best Transactions Paper Award for the best paper published in the IEEE Transactions on Electromagnetic Compatibility in 2015.
- 2005 IEEE EMC Transactions Prize Paper Award for the best paper published in the IEEE Transactions on Electromagnetic Compatibility in 2004.
- Best Symposium Paper Award from the 2018 Joint IEEE International Symposium on EMC and Asia-Pacific International Symposium on Electromagnetic Compatibility (IEEE EMC & APEMC 2018), Singapore.
- Best Symposium Paper Award from the 2015 Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC 2015), Taipei (Taiwan).
- Distinguished Reviewer of IEEE Transactions on Electromagnetic Compatibility in 2014, 2015, 2016, 2017.
- Senior Member of the Institute of Electrical and Electronics Engineers (IEEE), USA.

### Selected journal papers

- G. Spadacini, T. Liang, F. Grassi, and S. A. Pignari, "Worst Case and Statistics of Waveforms Involved in Wideband Intentional Electromagnetic Attacks," *IEEE Trans. Electromagn. Compat.*, early access article.
- K. Yuan, F. Grassi, G. Spadacini, and S. A. Pignari, "Reproducing field-to-wire coupling effects in twisted-wire pairs by crosstalk," *IEEE Trans. Electromagn. Compat.*, vol. 60, no. 4, 2018.
- K. Yuan, F. Grassi, G. Spadacini, and S. A. Pignari, "Accounting for wire coating in the modeling of field coupling to twisted-wire pairs," *IEEE Trans. Electromagn. Compat.*, vol.60, no. 1, 2018.
- N. Toscani, F. Grassi, G. Spadacini, and S. A. Pignari, "Transmission line and electromagnetic model of the tubular wave coupler," *IEEE Trans. Electromagn. Compat.*, vol. 59, no. 5, pp. 1592-1600, 2017.
- L. Badini L., G. Spadacini, F. Grassi, S.A. Pignari, and P. Pelissou, "A rationale for statistical correlation of conducted and radiated susceptibility testing in aerospace EMC", *IEEE Trans. Electromagn. Compat.*, vol. 59, no. 5, pp. 1576-1585, 2017.

- K. Yuan, F. Grassi, G. Spadacini, and S. A. Pignari, "Crosstalk-sensitive loops and reconstruction algorithms to eavesdrop digital signals transmitted along differential interconnects," *IEEE Trans. Electromagn. Compat.*, vol. 59, no. 1, pp. 256-265, 2017.
- F. Grassi, G. Spadacini, K. Yuan, and S. A. Pignari, "Relating crosstalk to plane-wave field-to-wire coupling," *IEICE Trans. Comm.*, vol. E99B, no. 11, pp. 2406-2413, 2016.
- G. Spadacini, F. Grassi, and S. A. Pignari, "Modelling and simulation of conducted emissions in the powertrain of electric vehicles," *Progress in Electromagnetic Research B*, Vol. 69, page 1-15, 2016. open access: DOI: 10.2528/PIERB16051604
- N. Toscani, G. Spadacini, F. Grassi, and S. A. Pignari, "Lumped and distributed-parameter circuit models of the electromagnetic clamp," *IEEE Trans. Electromagn. Compat.*, vol. 58, no. 4, pp. 1007-1015, Aug. 2016.
- F. Grassi, L. Badini, G. Spadacini and S. A. Pignari, "Crosstalk and mode conversion in adjacent differential lines," *IEEE Trans. Electromagn. Compat.*, vol. 58, no. 3, pp. 877-886, June 2016.
- F. Grassi, H. Abdollahi, G. Spadacini, S. A. Pignari, and P. Pelissou, "Radiated immunity test involving crosstalk and enforcing equivalence with field-to-wire coupling," *IEEE Trans. Electromagn. Compat.*, vol. 58, no. 1, pp. 66-74, Feb. 2016.
- G. Spadacini, F. Grassi, D. Bellan, S. A. Pignari, and F. Marliani, "Prediction of conducted emissions in satellite power buses," *Int. Journal Aerospace Engineering*, vol. 2015, pp. 1-10, open access: DOI 10.1155/2015/601426.
- G. Spadacini, F. Grassi, S. A. Pignari, "Field-to-wire coupling model for the common mode in random bundles of twisted-wire pairs," *IEEE Trans. Electromagn. Compat.*, vol. 57, no. 5, pp. 1246-1254, Oct. 2015.
- F. Grassi, Y. Yang, X. Wu, G. Spadacini, and S. A. Pignari, "On mode conversion in geometrically unbalanced differential lines and its analogy with crosstalk," *IEEE Trans. Electromagn. Compat.*, vol. 57, no. 2, pp. 283-291, Apr. 2015.
- F. Grassi, X. Wu, Y. Yang, G. Spadacini, and S. A. Pignari, "Modeling of imbalance in differential lines targeted to SPICE simulation," *Progress in Electromagnetic Research B*, Vol. 62, page 225-239, 2015.
- F. Grassi, G. Spadacini, S. A. Pignari, and F. Marliani, "Combined MTL-fullwave statistical approach for fast estimation of radiated immunity of spacecraft cable assemblies involving multipair bundles," *IEICE Trans. Comm.*, vol. E98B, no. 7, pp. 1204-1211, July 2015.
- G. Spadacini, F. Grassi, F. Marliani, and S. A. Pignari, "Transmission-line model for field-to-wire coupling in bundles of twisted-wire pairs above ground," *IEEE Trans. Electromagn. Compat.*, vol. 56, no. 6, pp.1682-1690, Dec. 2014.
- F. Grassi, G. Spadacini, and S. A. Pignari, "SPICE behavioral modeling of RF Current injection in wire bundles," *IEICE Trans. Commun.*, vol. E97-B, no. 2, pp. 424-431, Feb 2014.
- F. Grassi, G. Spadacini and S. A. Pignari, "The concept of weak imbalance and its role in the emissions and immunity of differential lines," *IEEE Trans. Electromagn. Compat.*, vol. 55, no.6, pp. 1346-1349, Dec. 2013.
- D. Bellan, G. Spadacini, E. Fedeli, and S. A. Pignari, "Space-frequency analysis and experimental measurement of magnetic field emissions radiated by high-speed railway systems," *IEEE Trans. Electromagn. Compat.*, vol. 55, no.6, pp. 1031-1042, Dec. 2013.
- G. Spadacini and S. A. Pignari, "Numerical assessment of radiated susceptibility of twisted-wire pairs with random nonuniform twisting," *IEEE Trans. Electromagn. Compat.*, vol. 55, no.5, pp. 956-964, Oct. 2013.
- S. A. Pignari, G. Spadacini, and E. Fedeli, "Measurement and assessment of exposure limits for the static magnetic field generated by large inductors for railway applications," *IEEE Trans. Electromagn. Compat.*, vol. 53, no. 3, pp. 638-644, Aug. 2011.
- S. A. Pignari and G. Spadacini, "Plane-wave coupling to a twisted-wire pair above ground," *IEEE Trans. Electromagn. Compat.*, vol. 53, no. 2, pp. 508-523, May 2011.
- G. Spadacini and S. A. Pignari, "Radiated susceptibility of a twisted-wire pair illuminated by a random plane-wave spectrum," *IEICE Trans. on Communications*, vol. E93-B, no. 7, pp. 1781-1787, July 2010.
- F. Grassi, G. Spadacini, F. Marliani, and S. A. Pignari, "Use of double bulk current injection for susceptibility testing of avionics," *IEEE Trans. Electromagn. Compat.*, vol. 50, no. 3, part 1, pp. 524-535, Aug. 2008.
- G. Spadacini, S. A. Pignari, and F. Marliani, "Closed-form transmission line model for radiated susceptibility in metallic enclosures," *IEEE Trans. on Electromagnetic Compatibility*, vol. 47, no. 4, pp. 701-708, Nov. 2005.
- G. Spadacini and S. A. Pignari, "A bulk current injection test conforming to statistical properties of radiation-induced effects," *IEEE Trans. on Electromagnetic Compatibility*, vol. 46, no. 3, pp. 446-458, Aug. 2004.

- D. Bellan, S. A. Pignari and G. Spadacini, "Characterisation of crosstalk in terms of mean value and standard deviation," *IEE Proceedings - Science, Measurement and Technology*, vol. 150, issue 6, pp. 289-295, Nov. 2003.
- S. Pignari and G. Spadacini, "BCI test conforming with statistical estimates of random-field radiation," *Electronics Letters*, vol. 38, no. 24, pp. 1499-1500, IEE, Nov. 2002.

### Selected conference papers

- F. Grassi, S. A. Pignari, G. Spadacini, P. Bisognin, P. Pelissou, and S. Marra, "Radiated susceptibility test procedure and setup exploiting crosstalk," in Proc. 2016 ESA Workshop on Aerospace EMC, Valencia, Spain, May 23-25, 2016, pp. 1-5.
- F. Grassi, S. A. Pignari, G. Spadacini, N. Toscani, and P. Pelissou, "Characterization of the IEC 61000-4-6 electromagnetic clamp for conducted-immunity testing," in Proc. 2016 ESA Workshop on Aerospace EMC, Valencia, Spain, May 23-25, 2016, pp. 1-4.
- L. Badini, F. Grassi, S. A. Pignari, G. Spadacini, P. Bisognin, P. Pelissou, and S. Marra, "Conducted susceptibility testing as an alternative approach to unit-level radiated-susceptibility verifications," in Proc. 2016 ESA Workshop on Aerospace EMC, Valencia, Spain, May 23-25, 2016, pp. 1-5.
- F. Grassi, S. A. Pignari, G. Spadacini, N. Toscani, and P. Pelissou, "Behavioral modeling of tubular wave coupler," in Proc. APEMC 2016, Asia-Pacific Int. Symp. on Electromagn. Compat., Shenzhen, China, May 17-21, 2016, pp. 720-722.
- L. Badini, F. Grassi, G. Spadacini, and S. A. Pignari, "Sensitivity analysis of proximity effects in nearby differential lines," in Proc. APEMC 2016, Asia-Pacific Int. Symp. on Electromagn. Compat., Shenzhen, China, May 17-21, 2016, pp. 717-719.
- L. Badini, F. Grassi, G. Spadacini, and S. A. Pignari, "Sensitivity of mode conversion in geometrically unbalanced coupled differential lines," in Proc. ICEAA 2015, Int. Conf. on Electromagnetics in Advanced Applications, Turin, Italy, Sept. 7-11, 2015, pp. 1361-1364.
- F. Grassi, G. Spadacini, and S. A. Pignari, "De-embedding setup-related effects to characterize an EM clamp for conducted immunity testing," in Proc. ICEAA 2015, Int. Conf. on Electromagnetics in Advanced Applications, Turin, Italy, Sept. 7-11, 2015, pp. 1369-1372.
- F. Grassi, G. Spadacini, and S. A. Pignari, "Time-domain response of bulk current injection probes to impulsive stress waveforms," in Proc. 2015 IEEE Int. Symp. on Electromagn. Compat., Dresden, Germany, Aug. 16-22, 2015, pp. 843-848.
- G. Spadacini, F. Grassi, and S. A. Pignari, "Statistical properties of low frequency voltages induced by a plane-wave field across the terminal loads of a random wire-bundle," in Proc. 2015 IEEE Int. Symp. on Electromagn. Compat., Dresden, Germany, Aug. 16-22, 2015, pp. 824-829.
- F. Grassi, G. Spadacini, and S. A. Pignari, "Effects of imbalance on conducted immunity of a PLC link onto a DC power-bus for spacecraft," in Proc. APEMC 2015, Asia-Pacific Int. Symp. on Electromagn. Compat., Taipei, Taiwan, May 26-29, 2015, pp. 665-668.
- G. Spadacini, F. Grassi, and S. A. Pignari, "SPICE simulation in time-domain of the CISPR 25 test setup for conducted emissions in electric vehicles," in Proc. APEMC 2015, Asia-Pacific Int. Symp. on Electromagn. Compat., Taipei, Taiwan, May 26-29, 2015, pp. 569-572.
- G. Spadacini, F. Grassi, and S. A. Pignari, "Statistical estimation of the electromagnetic noise induced by field-to-wire coupling in random bundles of twisted-wire pairs," in Proc. APEMC 2015, Asia-Pacific Int. Symp. on Electromagn. Compat., Taipei, Taiwan, May 26-29, 2015, pp. 661-664.
- G. Spadacini, F. Grassi, and S. A. Pignari, "A closed-form low-frequency statistical model for field-to-wire coupling in twisted-wire pairs with non-ideal twisting," in Proc. 2014 XXXIth URSI General Assembly, Beijing, Cina, Aug. 16-23, 2014, pp. 1-4.
- G. Spadacini, F. Grassi, S. A. Pignari, and F. Marliani, "Frequency-response variability of voltages induced by field-to-wire coupling in random bundles of twisted-wire pairs on-board small satellites," in Proc. 2014 XXXIth URSI General Assembly, Beijing, Cina, Aug. 16-23, 2014, pp. 1-4.
- F. Grassi, S. A. Pignari, G. Spadacini, and F. Marliani, "Sensitivity to setup configuration of the response of differential lines driven by an external field," in Proc. EMC'14/Tokyo Int. Symp. on Electromagn. Compat., Tokyo, Japan, May 12-16, 2014, pp. 852-855.
- F. Grassi, G. Spadacini, S. A. Pignari, and C. Rostamzadeh, "On the use of bulk current injection for testing the immunity of CAN-bus lines," in Proc. 2014 International Conference of Connected Vehicles and Expo (ICCVE), Vienna, Austria, Nov. 3-7, 2014, p. 46-51.

- G. Spadacini, D. Bellan, F. Grassi, and S. A. Pignari, "Measurement and modeling of low-frequency electromagnetic noise generated by moving trains in 25 kV ac high speed railway lines," in *Proc. 2014 International Conference of Connected Vehicles and Expo (ICCVE)*, Vienna, Austria, Nov. 3-7, 2014, p. 40-45.
- A. Beltramelli, F. Grassi, G. Spadacini, and S. A. Pignari, "Modeling conducted noise propagation along high-voltage DC power buses for electric vehicle applications," in *Proc. 2014 International Conference of Connected Vehicles and Expo (ICCVE)*, Vienna, Austria, Nov. 3-7, 2014, p. 52-57.
- G. Spadacini, F. Grassi, and S. A. Pignari, "On the combined effect of random nonuniformity and deformation of twisting on the radiated immunity of twisted-wire pairs," in *Proc. 2013 IEEE Int. Symp. on Electromagn. Compat.*, Denver, CO, USA, Aug. 5-9, 2013, pp. 489-493.
- F. Grassi, C. Rostamzadeh, P. Kolbe, G. Spadacini and S. A. Pignari, "Assessing linearity of injection probes used in BCI test setups for automotive applications," in *Proc. 2013 IEEE Int. Symp. on Electromagn. Compat.*, Denver, CO, USA, Aug. 5-9, 2013, pp. 128-133.
- D. Bellan, G. Spadacini, F. Grassi, E. Fedeli, and S. A. Pignari, "Modeling strategies for conducted and radiated emissions in high-speed railway lines," in *Proc. APEMC 2013, Asia-Pacific Int. Symp. on Electromagn. Compat.*, Melbourne, Australia, May 20-23, 2013, pp. 288-291.
- F. Grassi, C. Rostamzadeh, D. Bellan, G. Spadacini and S. A. Pignari, "Assessment of the bulk current injection test procedure based on the substitution method," in *Proc. APEMC 2013, Asia-Pacific Int. Symp. on Electromagn. Compat.*, Melbourne, Australia, May 20-23, 2013, pp. 418-421.
- F. Grassi, G. Spadacini, and S. A. Pignari, "Human exposure in arc-welding processes: current versus previous ICNIRP basic restrictions," in *Proc. 2012 IEEE Int. Symp. on Electromagn. Compat.*, Pittsburgh, PA, USA, Aug. 5-10, 2012, pp. 749-754.
- L. Ghislanzoni, F. Grassi, F. Marliani, S. A. Pignari, and G. Spadacini, "Terminal units for experimental assessment of bundles of twisted-wire pairs exposed to external radiation," in *Proc. 2012 ESA Workshop on Aerospace EMC*, Venezia, Italy, May 21-23, 2012, pp. 1-4.
- G. Spadacini and S. A. Pignari, "Numerical electromagnetic modeling of chemical plants for the assessment of radio frequency ignition hazards," in *Proc. XXX General Assembly and Scientific Symposium of the International Union of Radio Science (URSI GASS 2011)*, Istanbul, Turkey, Aug. 13-20, 2011, Session E01, Paper 6, pp. 1-4.
- S. A. Pignari and G. Spadacini, "Influence of twist-pitch random non-uniformity on the radiated immunity of twisted-wire pairs," in *Proc. XXX General Assembly and Scientific Symposium of the International Union of Radio Science (URSI GASS 2011)*, Istanbul, Turkey, Aug. 13-20, 2011, Session E10, Paper 9, pp. 1-4.
- G. Spadacini, S. A. Pignari, and F. Marliani, "Experimental measurement of the response of a twisted-wire pair exposed to a plane-wave field," in *Proc. 2011 IEEE Int. Symp. on Electromagn. Compat.*, Long Beach, CA, USA, Aug. 14-19, 2011, pp. 828-833.
- E. Fedeli, S. A. Pignari, and G. Spadacini, "Fast and accurate measurement of radiated emission of moving trains according to IEC 62236," in *Proc. 9th World Congress on Railway Research (WCRR 2011)*, Lille, France, May 22-26, 2011, Session B1, Paper 3, pp. 1-8.
- E. Fedeli, S. A. Pignari, and G. Spadacini, "Measurement of the static magnetic field generated by large inductors for railway applications," in *Proc. 9th World Congress on Railway Research (WCRR 2011)*, Lille, France, May 22-26, 2011, Session B1, Paper 4, pp. 1-6.
- D. Bellan, F. Marliani, S. A. Pignari, and G. Spadacini, "Spectral analysis of conducted emissions of DC/DC converters," in *Proc. 2010 IEEE Int. Symp. on Electromagn. Compat.*, Fort Lauderdale, FL, USA, July 25-30, 2010, pp. 490-494.
- E. Fedeli, S. A. Pignari, and G. Spadacini, "Experimental characterization of the static magnetic field generated by railway filters," in *Proc. 2010 Int. Symp. on Power Electronics, Electrical Drives, Automation and Motion (SPEEDAM 2010)*, Pisa, Italy, June 14-16, 2010, pp. 1800-1803.
- G. Spadacini, D. Bellan, S. A. Pignari, R. Grossi, and F. Marliani, "Prediction of conducted emissions of DC/DC converters for space applications," in *Proc. APEMC 2010, Asia-Pacific Int. Symp. on Electromagn. Compat.*, Beijing, China, April 12-16, 2010, pp. 810-813.
- S. A. Pignari and G. Spadacini, "Statistical model for radiated susceptibility of TWPs under complex random excitation," in *Proc. EMC'09 Kyoto, Int. Symposium on Electromagnetic Compatibility*, Kyoto, Japan, July 20-24, 2009, Paper n. 24R1-1, pp. 749-752.
- D. Bellan, G. Magistrati, S. A. Pignari, and G. Spadacini, "A statistical approach to radiated susceptibility analysis of TWP cables," in *Proc. 2009 ESA Workshop on Aerospace EMC*, Firenze, Italy, March 30 - April 1, 2009, Poster Session 1, Paper 5, pp. 1-6.

- S. Alia, D. Bellan, R. Grossi, S. A. Pignari, and G. Spadacini, "Behavioral modeling of DC/DC converter conducted emissions," in *Proc. 2009 ESA Workshop on Aerospace EMC*, Firenze, Italy, March 30 - April 1, 2009, Session 8, Paper 2, pp. 1-6.
- E. Fedeli, S. A. Pignari, and G. Spadacini, "High-frequency experimental characterization of impedance bonds used in railway systems," in *Proc. of the 8th Int. Symposium on Electromagnetic Compatibility (EMC Europe 2008)*, Hamburg, Germany, Sept. 8-12, 2008, pp. 13-18.
- F. Grassi, G. Spadacini, F. Marliani, and S. A. Pignari, "Vertical illumination in radiated susceptibility tests: Reconstruction of EMI effects on shielded cables," in *Proc. 2emc 2007, IEEE Symp. on Embedded EMC*, Rouen, France, Oct. 18-19, 2007, paper 1B, pp.1-6.
- F. Marliani, G. Spadacini, and S. A. Pignari, "Double bulk current injection test with amplitude and phase control," in *Proc. EMC Zurich 2007 in Munich, Int. Symp. Electromagn. Compat.*, Munich, Germany, Sept. 24-28, 2007, pp. 429-432.
- S. A. Pignari and G. Spadacini, "A simplified statistical model for crosstalk in balanced twisted pairs," in *Proc. 23rd Annual Review of Progress in Applied Computational Electromagnetics, ACES 2007*, Verona, Italy, March 19-23, 2007, pp. 1638-1643.
- F. Grassi, G. Spadacini, F. Marliani, and S. A. Pignari, "The use of FEKO for the modeling of test set-ups for radiated susceptibility," in *Proc. 23rd Annual Review of Progress in Applied Computational Electromagnetics, ACES 2007*, Verona, Italy, March 19-23, 2007, pp. 279-284.
- G. Spadacini and S. A. Pignari, "Impact of common-to-differential mode conversion on crosstalk in balanced twisted pairs," in *Proc. 2006 IEEE Int. Symp. on Electromagn. Compat.*, Portland, OR, USA, Aug. 14-18, 2006, Session TU-PM-3, pp. 1-6. ISBN: 1-4244-0294-8.
- S. A. Pignari, G. Spadacini, D. Bellan, and A. Gaggelli, "Measurement of rolling-stock radiated emissions according to standard EN 50121," in *EMC Zurich in Singapore 2006 Int. Symp. Electromagn. Compat. - Workshop notes*, Singapore, Feb. 27 - March 3, 2006, pp. 250-255. ISBN: 3-9522990-7-3.
- G. Spadacini, S. A. Pignari, and F. Marliani, "Incident-field measurement in proximity of wiring harness for radiated susceptibility assessment," in *Proc. 2005 IEEE Int. Symp. on Electromagn. Compat.*, Chicago, IL, USA, Aug. 8-12, 2005, pp. 766-771. ISBN: 0-7803-9380-5.
- G. Spadacini, D. Bellan and S. A. Pignari, "Bounds for conducted emissions in three-conductor systems with long feeders," in *Proc. 2004 IEEE Int. Symp. on Electromagn. Compat.*, Santa Clara, CA, USA, Aug. 9-13, 2004, pp. 604-609. ISBN: 0-7803-8443-1.
- G. Spadacini, S. A. Pignari, F. Marliani, and F. Canavero, "A transmission line model for radiated susceptibility of wiring harness in closed environments," in *Proc. PIERS 2004 Progress in Electromagnetic Research Symposium*, Pisa, Italy, March 28-31, 2004, pp. 691-694. ISBN: 88-8492-268-2.
- F. Marliani, G. Spadacini, S. A. Pignari, and F. Canavero, "Assessment of analytical field-to-wire coupling in closed environments via full electromagnetic simulation," in *Proc. ESA - CNES EMC Workshop*, ESTEC, Noordwijk, The Netherlands, Feb. 12-13, 2004, pp. 57-63.
- G. Spadacini, D. Bellan and S. Pignari, "Impact of twist non-uniformity on crosstalk in twisted-wire pairs", in *Proc. 2003 IEEE Symp. on Electromagn. Compat.*, Boston, MA, USA, Aug. 18-22, 2003, pp. 483-488. ISBN: 0-7803-7835-0.
- G. Spadacini and S. Pignari, "The statistical equivalence of bulk current injection and random-field radiation" in *Proc. EMC Zurich 2003 Int. Symp. Electromagn. Compat.*, Zurich, Switzerland, Feb. 18-20, 2003, pp. 311-316. ISBN: 3-9521199-7-0.
- D. Bellan, G. Spadacini and S. Pignari, "Prediction of twist non-uniformity and twist-residual effects on crosstalk in twisted-wire pairs", in *Proc. EMC Zurich 2003 Int. Symp. Electromagn. Compat.*, Zurich, Switzerland, Feb. 18-20, 2003, pp. 181-186. ISBN: 3-9521199-7-0.

## Educational activity

### University Courses:

- **Elettrotecnica**, corso di laurea in Ing. Chimica, Scuola di Ingegneria Industriale e dell'Informazione, Politecnico di Milano  
Academic Years: **2009/10; 2010/11; 2011/12; 2012/13; 2013/14; 2014/15; 2015/16; 2016/17; 2017/18; 2018/19.**

- **Compatibilità Elettromagnetica Industriale I+II**, corso di laurea specialistica in Ing. Elettrica, III Facoltà di Ingegneria (Ingegneria dei Processi Industriali), Politecnico di Milano.  
Academic Year: **2008/09**
- **Principi di Ingegneria Elettrica**, corso di laurea in Ing. Meccanica, IV Facoltà di Ingegneria (Ingegneria Industriale), Politecnico di Milano, Polo Regionale di Lecco.  
Academic Year: **2006/07**

Seminars (esercitazioni e/o laboratori) for other University Courses:

- **Elettrotecnica**, corsi di laurea in Ing. Informatica e Ing. dell'Automazione (Sez. ROT-Z). Scuola di Ingegneria Industriale e dell'Informazione.  
Academic Years: **2017/18; 2018/19.**
- **Elettrotecnica** (fino al 2008/09: Elettrotecnica A), corso di laurea in Ing. dell'Automazione, Scuola di Ingegneria Industriale e dell'Informazione (fino al 2012/13: V Facoltà di Ingegneria – Ing. dell'Informazione), Politecnico di Milano  
Academic Years: **2007/08; 2008/09; 2009/10; 2010/11; 2011/12; 2012/13; 2013/14; 2014/15; 2015/16; 2016/17.**
- **Elettrotecnica I (per allievi elettrici)**, (fino al 2002/03: Elettrotecnica I), corso di laurea in Ing. Elettrica, III Facoltà di Ingegneria (Ingegneria dei Processi Industriali), Politecnico di Milano.  
Academic Years: **2002/03; 2003/04; 2004/05; 2005/06; 2006/07; 2007/08.**
- **Compatibilità Elettromagnetica Industriale I+II**, corso di laurea specialistica in Ing. Elettrica, III Facoltà di Ingegneria (Ingegneria dei Processi Industriali), Politecnico di Milano.  
Academic Years: **2003/04; 2004/05; 2005/06; 2006/07; 2007/08; 2009/10.**