

# Stefano Bregni

## Curriculum Vitae

(Full CV: <http://home.deib.polimi.it/bregni>)



## Contact Data

Prof. Stefano Bregni  
 Politecnico di Milano - Dept. of Electronics and Information  
 Piazza Leonardo da Vinci 32, 20133 MILANO MI, Italy  
 Ph.: +39-02-2399.3503 - Fax: +39-02-2399.3413  
 Email: [bregni@elet.polimi.it](mailto:bregni@elet.polimi.it), [s.bregni@ieee.org](mailto:s.bregni@ieee.org)  
 Web page: <http://home.deib.polimi.it/bregni/>

## Biography and Professional Experience

- From 1999 to date: tenured Assistant (1999-2004) and then tenured Associate (since 2004) Professor of Telecommunications at Politecnico di Milano - Dept. of Electronics and Information, Italy.
- From 1994 to 1999: Senior Researcher, Head of the Transmission Systems Dept at CEFRIEL Centre, Milano, Italy;.
- From 1991 to 1994: system engineer at SIRT I SpA, Italy. He took part to the first experimental trial of SDH equipment in Italy with Telecom Italia, designing test methodologies and plans. He worked in the Italian Study Group on Network Synchronization (Sirti, Telecom Italia, Fondazione Ugo Bordoni), designing test methodologies and carrying out trial experimental measurements on clocks deployed.
- In 1990, he received his *Dr. Ing.* degree in Telecommunications Engineering from Politecnico di Milano (*cum laude*) and a MSc from CEFRIEL Centre, Milano, Italy.
- He was born in Milano, Italy, in 1965.
- From 2013: lecturer in a Master Program of Telecommunications Engineering at Universidad Pontificia Bolivariana (UPB), Medellin, Colombia.
- From 2012: lecturer in Master Programs of Telecommunications Engineering at Escuela Superior Politécnica del Litoral (ESPOL), Guayaquil, Ecuador.
- From 2006 to 2008: lecturer at the Italian Swiss University, Lugano, Switzerland (Professor of Telecommunications Networks).
- Freelance lecturer of technical courses on transmission systems and network synchronization for leading telecommunications industrial companies and operators in Italy (since 1994) and worldwide (since 2007, trainings given in Kuala Lumpur, Singapore, Kampala, Dhaka, Accra, Islamabad to engineers of international telecommunications operators).
- Responsible of research contracts between Polytechnic of Milan / Dept. of Electronics and Information and:
  - Nokia-Siemens Networks, 2007, on timing transfer techniques over packet networks;
  - Prod-El / Selex Communications., 2003, for a multi-disciplinary training program;
  - Italferr (Italian Railways), 2000, for the design of the synchronization network of the SDH network of the Italian Railways. The designed synchronization network included about 12 office clocks (SASE), to be deployed over the whole Italian country.
- Member of study groups set up by the Italian Authority on Communications (AGCOM) on the unbundling of the Italian access network (1999) and on the next-generation optical access network (2009).
- Responsible or involved in research programs funded by the Italian Ministry of Research and University:
  - MIMOSA (Experimental Measures and Traffic Models in Packet-Switched Networks), 2006-2007;
  - OSATE (Optics in Switching Architectures: Theory and Experimentation), 2006-2007;
  - WONDER (WDM Optical Network DEMonstrator over Rings), 2004-2005;
  - TANGO (Traffic models and Algorithms for Next Generation IP networks Optimization), 2003-2004;
  - ADONIS (Algorithms for Dynamic Optical Networks based on Internet Solutions), 2003-2004;
  - IPPO (IP Packet Optical Networks), 2001-2002.
- Involved in European research programs:

- EC 7FP BONE (European Commission 7<sup>th</sup> Framework Programme Network of Excellence. Building the Future Optical Network in Europe), 2008-2010;
- EC 6FP e-Photon/ONE (European Commission 6<sup>th</sup> Framework Programme Network of Excellence. Optical Networks: Towards Bandwidth Manageability and Cost Efficiency), 2004-2006; e-Photon/One+, 2006-2008;
- HECTOR (*Health Emergency management and Coordination through Telematics Operational Resources*), 1996-1998.

## Research Areas

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- Network synchronization, clock stability characterization and measurement.
- Characterization and modelling of telecommunications traffic.
- Optical WDM networks.
- Access systems.
- TCP performance.

## International Appointments and Titles

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- Senior Member of the IEEE for 15 years (since 1999). Member of the IEEE for 21 years (since 1993).

### Offices in the IEEE Communications Society

- Vice-President for Member Relations (2014-2015).
- Member-at-Large on the Board of Governors (2010-2012, 2013-2015).
- Director of Education (2008-2011).
- Chair of the Transmission, Access and Optical Systems Technical Committee, 2008-2009 (Vice-Chair 2006-2007, 2002-2003; Secretary 2004-2005).
- Member-at-Large of the GLOBECOM/ICC Technical Content (GITC) committee (2006-2010). GITC advisor of ICC 2007 and ICC 2011. Responsible of the GITC working groups for the definition of the GLOBECOM/ICC standard review form and GLOBECOM /ICC standard review process.
- Member of the TC Recertification Committee (2010-2012).
- Member of the Award Jury of the Latin America Region.

### Conferences

- Member of the Executive Committee, proposed Technical Program Co-Chair (pending approval by GITC) of IEEE ICC2016, Kuala Lumpur, Malaysia, 2016.
- Technical Program Vice-Chair of IEEE GLOBECOM2012, Anaheim, CA, USA, 2012.
- Symposia Chair of IEEE GLOBECOM2009, Honolulu, Hawaii, USA, 2009.
- Workshop co-chair of the IEEE Consumer Communication Network Conference 2008 (IEEE CCNC 2008), Las Vegas, NE, USA, 2008.
- Technical Program Co-Chair of IEEE 3rd Latin-American Conference on Communications (LATINCOM2011), Belém, Brazil, 2011.
- Symposium Co-Chair in GLOBECOM2013, ICC2011, GLOBECOM2010, ICC2008, GLOBECOM2007, ICC2007, ICC2006, GLOBECOM2005, ICC2004.
- Technical program Vice-Chair of the IEEE/IFIP 9th International Conference on Optical Network Design and Modelling (ONDM2005), Milano, Italy, 2005.
- Member of the Steering Committee of IEEE LATINCOM conferences.
- Member of the Steering Group of the NIST-ATIS-IEEE Workshop on Synchronization in Telecommun. Systems.
- Member of the Technical Program Committee of more than other 40 various IEEE conferences.

### Publications

- Editor of IEEE Global Communications Newsletter (since 2007).
- Associate Editor of IEEE Communications Surveys and Tutorials (since 2007).
- Guest Editor of the Feature Topic "Synchronization over Ethernet and IP in Next-Generation Networks", IEEE Communications Magazine, Vol.50, No.1, Feb.2011.
- Regular reviewer of international journals (e.g.: IEEE Trans. on Communications, IEEE Trans. on Instrumentation and Measurement, IEEE Journal on Selected Areas in Communications, IEEE Journal on Lightwave Technology, Wiley European Trans. on Telecommunications, IEEE Communications Magazine, IEEE Communications Letters, KICS Journal of Commun. and Networks) and conferences (e.g.: IEEE ICC and GLOBECOM).

## Other

- Distinguished Lecturer (2005-2009, Expert Lecturer 2003-2004) of the IEEE Communications Society. Distinguished Lecturer Tours were given in El Salvador, Panama (2009); Malaysia (2009); Peru, Bolivia, Colombia (2008); Mexico, El Salvador, Panama, Colombia (2007); Colombia, Ecuador, Panama (2006); India (2006); Poland (2005); Puerto Rico, Mexico (2005); USA (2004); Mexico, Costa Rica, El Salvador, Guatemala (2003).
- Best Paper Award, IEEE LATINCOM2010, Bogota, Colombia, Sept.2010.
- Lecturer in the online program *Tutorials Now* of the IEEE Communications Society (since 2007).
- Tutorial lecturer in the technical program of the IEEE conferences GLOBECOM 2005 (St. Louis, USA, Nov. 2005), GLOBECOM 2003 (S. Francisco, USA, Dec. 2003), GLOBECOM 2002 (Taipei, Taiwan, Nov. 2002), ICC 2000 (New Orleans, USA, June 2000).
- He contributed significantly to the activities of the ETSI (TM3 WG6) and ITU-T (Q21/13) committees on network synchronization (author of 6 technical contributions).

## Selected Publications

### Books

1. S. Bregni, "Synchronization of Digital Telecommunications Networks". Chichester, UK: John Wiley & Sons. 2002. 430 pages. ISBN: 0-471-61550-1. Russian translation: "Синхронизация цифровых сетей связи" ("*Sincronizazia zifrovih sotoi sviasi*"). Moskow, Russia: MIR Publishers. 2003. ISBN: 5-03-003588-5.
2. S. Bregni, "Sistemi di trasmissione PDH e SDH - Multiplazione". Milano, Italy: McGraw-Hill. 2004. 320 pages. ISBN: 88-386-3434-3.

### Articles in books

1. S. Bregni, "Clocks in Telecommunications" (invited paper). In *Encyclopedia of Electrical and Electronics Engineering*, 24 vols., pp. 497-511. Editor: John G. Webster. New York, USA: John Wiley & Sons. 1999. Also included in *Survey of Instrumentation and Measurement*, pp. 743-757. Editor: S. Dyer. New York, USA: John Wiley & Sons. 2001. ISBN # 0-471-39484X.
2. S. Bregni, "Capitolo 5. Metodi di misura di tempo e frequenza" (Chapter 5 – Methods of time and frequency measurement) in *La sincronizzazione nelle reti numeriche di telecomunicazioni*, co-authored by the Italian National Study Group on Network Synchronization, published by CSELT, Torino, Italy, 1996.

### Journals and Magazines

1. M. Tornatore, G. Fontana, M. Rionno, S. Bregni, A. Pattavina, "Energy-Efficiency of All-Optical Transport through Time-Driven Switching", *IET Optoelectronics*, Vol. 6, No. 4, Aug. 2012, pp. 173-182.
2. S. Bregni, P. Giacomazzi, G. Saddemi, "Long-Range Dependence of Traffic across Schedulers with Multiple Service Classes", *Elsevier Computer Communications*, Vol. 35, No. 7, Apr. 2012, pp. 842-848. Elsevier B.V. Netherlands.
3. S. Bregni, P. Giacomazzi, A. Poli, "Cost-Performance Optimization of SSL-Based Secure Distributed Infrastructures", *IEEE Latin America Transactions*, Vol. 9, No. 4, July 2011, pp. 550-556.
4. S. Bregni, V. Grković, F. Musumeci, M. Tornatore, F. Vismara, "On the Energy Efficiency of IP-over-WDM Networks", *IEEE Latin America Transactions*, Vol. 9, No. 4, July 2011, pp. 477-483.
5. B. Gi Lee, S. Bregni, C. Desmond, J. Pape, "The President's Page - Education, Training and Certification: Disseminating ComSoc's Technological Assets", *IEEE Communications Magazine*, Vol. 49, No. 8, Aug. 2011, pp. 6-9.
6. S. Bregni, R. Subrahmanyam, "Synchronization over Ethernet and IP in next-generation networks", Guest Editorial, *IEEE Communications Magazine*, Vol. 49, No. 2, Feb. 2011.
7. S. Bregni, A. Pattavina, M. Rebughini, A. Sipone, "Design of IP Optical Nodes Based on AWG with Shared Tunable Wavelength Converters", *Optical Switching and Networking*, Vol. 8, No. 1, January 2011, pp. 23-31. Elsevier B.V. Netherlands.
8. S. Bregni, M. Decina, P. Giacomazzi, A. Poli, "Milano Digital City: Planning the Municipal Wireless Network of Milano", *IEEE Latin America Transactions*, Vol. 8, No. 4, Aug. 2010, pp. 425-431.
9. S. Bregni, A. Caruso, A. Pattavina, "Buffering-Deflection Tradeoffs in Optical Burst Switching", *Photonic Network Communications*, Vol. 20, No. 2, Oct. 2010, pp. 193-200. Springer, USA.
10. S. Bregni, P. Giacomazzi, G. Saddemi, "Characterization of Long-Range Dependent Traffic Regulated by Leaky-Bucket Policers and Shapers", *Elsevier Computer Communications*, Vol. 33, No. 6, Apr. 2010, pp. 714-720. Elsevier B.V. Netherlands.
11. S. Bregni, D. Zuckerman, "The President's Page - Educational Activities: Helping Careers Flourish", *IEEE Communications Magazine*, Vol. 47, No. 11, Nov. 2009, pp. 6-8.
12. S. Bregni, G. Bruzzi, M. Decina, "Traffic Trading in the Competitive International Voice Market", *IEEE Communications Magazine*, Vol. 47, No. 8, Aug. 2009, pp. 100-106.
13. S. Bregni, L. Jmoda, "Accurate Estimation of the Hurst Parameter of Long-Range Dependent Traffic Using Modified Allan and Hadamard Variances", *IEEE Transactions on Communications*, Vol. 56, No. 11, Nov. 2008, pp. 1900-1906.
14. S. Bregni, R. Cioffi, M. Decina, "An Empirical Study on Time-Correlation of GSM Telephone Traffic", *IEEE Transactions on Wireless Communications*, Vol. 7, No. 9, Sept. 2008, pp. 3428-3435.
15. S. Bregni, R. Gaudino, A. Pattavina, D. Carzaniga, A. Antonino, "Slot Synchronization of a WDM Packet-Switched Slotted Ring", *IEEE/OSA Journal of Lightwave Technology*, Vol. 25, No. 10, Oct. 2007, pp. 2922-2930.
16. S. Bregni, "Timing Rearrangements of SEC and SASE Slave Clock Chains Due to Non-Small Input Phase and Frequency Hits in Synchronisation Networks", *European Trans. on Telecomm.*, Vol. 17, No. 4, July-August 2006, pp. 473-481. John Wiley & Sons.
17. S. Bregni, A. Pattavina, "Performance Evaluation of Deflection Routing in Optical IP Packet-Switched Networks", *Cluster Computing*, Vol. 7, No. 3, July 2004. Kluwer Academic Publishers.
18. S. Bregni, A. Pattavina, G. Vegetti, "Architectures and Performance of AWG-Based Optical Switching Nodes for IP Networks", *IEEE Journal on Selected Areas in Communications*, Vol. 21, No. 7, Sept. 2003, pp. 1113-1121.
19. S. Bregni, U. Janigro, A. Pattavina, "Optimal Allocation of Limited Optical-Layer Resources in WDM Networks under Static Traffic Demand", *Photonic Network Communications*, Vol. 5, No. 1, Jan. 2003, pp. 33-40, Kluwer Academic Publishers.

20. S. Bregni, G. Guerra, A. Pattavina, "Optical Switching of IP Traffic Using Input Buffered Architectures", *Optical Networks Magazine*, Vol. 3, No. 6, Nov./Dec. 2002. SPIE/Kluwer Academic Publishers.
21. S. Bregni, R. Melen, "Local Loop Unbundling in the Italian Network", *IEEE Commun. Mag.*, Vol. 40, No. 10, Oct. 2002, pp. 86-93.
22. S. Bregni, S. Maccabruni, "Fast Computation of Maximum Time Interval Error by Binary Decomposition", *IEEE Transactions on Instrumentation and Measurement*, Vol. 49, No. 6, Dec. 2000, pp. 1240-1244.
23. S. Bregni, "A Historical Perspective on Network Synchronization", *IEEE Communications Magazine*, Vol. 36, No. 6, June 1998, pp. 158-166.
24. S. Bregni, "Clock Stability Characterization and Measurement in Telecommunications", *IEEE Transactions on Instrumentation and Measurement*, Vol. 46, No. 6, Dec. 1997, pp. 1284-1294.
25. S. Bregni, M. Carbonelli, D. De Seta, D. Perucchini, "Impact of the Time Error Sampling Period on Telecommunications Clock Stability Measures", *European Transactions on Telecommunications*, Vol. 8, No. 6, Nov. 1997.
26. S. Bregni, "Measurement of Maximum Time Interval Error for Telecommunications Clock Stability Characterization", *IEEE Trans. on Instrumentation and Measurement*, Vol. 45, No. 5, Oct. 1996, pp. 900-906.
27. S. Bregni, M. D'Agrosa, L. Valtriani, "Jitter Testing Technique and Results at the Desynchronizer Output of SDH Equipment", *IEEE Transactions on Instrumentation and Measurement*, Vol. 44, No. 3, June 1995, pp. 675-678.

## Conferences

1. A. Bianchi, S. Bregni, I. Crimaldi, M. Ferrari, "Analysis of a Hurst Parameter Estimator Based on the Modified Allan Variance", *Proc. of IEEE GLOBECOM 2012*, Anaheim, CA, USA, 3-7 December, 2012.
2. S. Bregni, D. Lucerna, C. Rottondi, G. Verticale, "Using per-Source Measurements to Improve Performance of Internet Traffic Classification", *Proc. of IEEE LATINCOM 2010*, Bogota, Colombia, 14-17 September 2010.
3. S. Bregni, P. Giacomazzi, A. Poli, "Cost-Performance Optimization of SSL-Based Secure Distributed Infrastructures", *Proc. of IEEE LATINCOM 2010*, Bogota, Colombia, 14-17 September 2010.
4. S. Bregni, G. Bruzzi, M. Decina, "The Network Operator's Perspective on Peer-to-Peer: Business Threats or Opportunities?", *Proc. of IEEE LATINCOM 2010*, Bogota, Colombia, 14-17 September 2010.
5. S. Bregni, V. Grkovic, F. Musumeci, M. Tornatore, F. Vismara, "On the Energy Efficiency of IP-over-WDM Networks", *Proc. of IEEE LATINCOM 2010*, Bogota, Colombia, 14-17 September 2010.
6. S. Bregni, A. Baruffaldi, A. Pattavina, "Active Measurement and Time-Domain Characterization of IP Packet Jitter", *Proc. of IEEE LATINCOM 2009*, Medellin, Colombia, Sept. 8-11, 2009.
7. S. Bregni, M. Decina, P. Giacomazzi, Alessandro Poli, "Milano Digital City: Planning the Municipal Wireless Network of Milano", *Proc. of IEEE LATINCOM 2009*, Medellin, Colombia, Sept. 8-11, 2009.
8. S. Bregni, P. Giacomazzi, G. Saddemi, "On Traffic Long-Range Dependence at the Output of Schedulers with Multiple Service Classes", *Proc. of IEEE GLOBECOM 2008*, New Orleans, LA, USA, Nov. 2008.
9. S. Bregni, R. Cioffi, P. Giacomazzi, "Queueing Performance of Long-Range Dependent Traffic Regulated by Token-Bucket Policers", *Proc. of IEEE GLOBECOM 2008*, New Orleans, LA, USA, Nov. 2008.
10. S. Bregni, P. Giacomazzi, G. Saddemi, "Transport of Long-Range Dependent Traffic in Single-Hop and Multi-Hop IEEE 802.11e Networks", *Proc. of IEEE GLOBECOM 2008*, New Orleans, LA, USA, Nov. 2008.
11. S. Bregni, P. Giacomazzi, G. Saddemi, "Output Traffic Characterization of Policers and Shapers with Long-Range Dependent Input Traffic", *Proc. of IEEE GLOBECOM 2007*, Washington, DC, USA, Nov., 2007.
12. S. Bregni, P. Giacomazzi, G. Saddemi, "Properties of the Traffic Output by a Leaky-Bucket Policier with Long-Range Dependent Input Traffic", *Proc. of IEEE ICC 2007*, Glasgow, UK, June 2007.
13. S. Bregni, L. Lacavalla, B. Propersi, F. Residori, "Synchronization of Single-Frequency Simulcast Networks Using Network Time Protocol", *Proc. of IEEE ICC 2007*, Glasgow, UK, June, 2007.
14. S. Bregni, R. Cioffi, M. Decina, "An Empirical Study on Statistical Properties of GSM Telephone Call Arrivals", *Proc. of IEEE GLOBECOM 2006*, S. Francisco, CA, USA, Nov. 2006.
15. S. Bregni, G. Bruzzi, M. Decina, "Minutes Trading in The International Long-Distance Voice Market", *Proc. of IEEE GLOBECOM 2006*, S. Francisco, CA, USA, Nov. 2006.
16. S. Bregni, L. Jmoda, "Improved Estimation of the Hurst Parameter of Long-Range Dependent Traffic Using the Modified Hadamard Variance", *Proc. of IEEE ICC 2006*, Istanbul, Turkey, June 2006.
17. S. Bregni, D. Carzaniga, R. Gaudino, Achille Pattavina, "Slot Synchronization of WDM Packet-Switched Slotted Rings: the WONDER Project", *Proc. of IEEE ICC 2006*, Istanbul, Turkey, June 2006.
18. S. Bregni, L. Savastano, A. Pattavina, S. Bregni, M. Martinelli, "Optical-Switch Benes Architecture based on 2-D MEMS", *Proc. of IEEE 2006 Workshop on High Perf. Switching and Routing (HPSR2006)*, Poznan, Poland, 2006.
19. S. Bregni, W. Erangoli, "Fractional Noise in Experimental Measurements of IP Traffic in a Metropolitan Area Network", *Proc. of IEEE GLOBECOM 2005*, St. Louis, MO, USA, Nov. 2005.
20. S. Bregni, E. Costamagna, W. Erangoli, L. Favalli, A. Pattavina, F. Tarantola, "Synthesis and MAVAR Characterization of Self-Similar Traffic Traces from Chaotic Generators", *Proc. of IEEE 3rd Internat. Workshop on QoS in Multiservice IP Netw.*, Catania, Italy, 2005.
21. S. Bregni, L. Primerano, "The Modified Allan Variance as Time-Domain Analysis Tool for Estimating the Hurst Parameter of Long-Range Dependent Traffic", *Proc. of IEEE GLOBECOM 2004*, Dallas, TX, USA, Nov. 2004.
22. S. Bregni, D. Biffi, "Timing Rearrangements of SEC and SASE Slave Clock Chains Due to Non-Small Input Phase and Frequency Hits in Synchronization Networks", *Proc. of IEEE ICC 2004*, Paris, France, June 2004.
23. S. Bregni, L. Barbieri, "Experimental Evaluation of the Impact of Network Frequency Synchronization on GSM Quality of Service During Handover", *Proc. of IEEE GLOBECOM 2003*, S. Francisco, CA, USA, Dec. 2003.
24. S. Bregni, D. Caratti, F. Martignon, "Enhanced Loss Differentiation Algorithms for Use in TCP Sources over Heterogeneous Wireless Networks", *Proc. of IEEE GLOBECOM 2003*, S. Francisco, CA, USA, Dec. 2003.
25. A. Pattavina, S. Bregni, L. Galimberti, "On the Analysis Tools of Traffic Fractality", *Proc. of IEEE GLOBECOM 2003*, S. Francisco, CA, USA, Dec. 2003.
26. S. Bregni, A. Pattavina, G. Vegetti, "Traffic Performance of Buffering Strategies in All-Optical Nodes for IP Networks", *Proc. of 2003 Workshop on High Perf. Switching and Routing (HPSR 2003)*, Torino, Italy, June 2003.
27. M. Baresi, S. Bregni, A. Pattavina, G. Vegetti, "Deflection Routing Effectiveness in Full-Optical IP Packet Switching Networks", *Proc. of IEEE ICC 2003*, Anchorage, AK, USA, May 2003.

28. S. Bregni, A. Pattavina, G. Vegetti, "AWG-Based WDM Switching Architectures for All-Optical IP Networks", *Proc. of Optical Networks Design and Modelling Conference (ONDM 2003)*, Budapest, Hungary, Feb. 2003.
29. S. Bregni, G. Guerra, A. Pattavina, "Node Architecture Design for All-Optical IP Packet Switching", *Proc. of IEEE GLOBECOM 2002*, Taipei, Taiwan, Nov. 2002.
30. S. Bregni, G. Guerra, A. Pattavina, "Optical Packet Switching of IP Traffic", *Proc. of Optical Networks Design and Modelling Conference (ONDM 2002)*, Torino, Italy, Feb. 2002.
31. S. Bregni, U. Janigro, A. Pattavina, "Optimal Allocation of Limited Optical-Layer Resources in WDM Networks under Static Traffic Demand", *Proc. of IEEE GLOBECOM 2001*, San Antonio, TX, USA, Nov. 2001.
32. S. Bregni, G. Guerra, A. Pattavina, "Optical Packet Switching for IP-over-WDM Transport Networks", *Proc. of 2001 Tyrrhennian International Workshop on Optical Communications*, Taormina, Italy, Sept. 2001.
33. S. Bregni, S. Maccabruni, "Fast Computation of Maximum Time Interval Error by Binary Decomposition", *Proc. of IEEE ICC '99*, Vancouver, BC, Canada, June 1999.
34. S. Bregni, F. Setti, "Impact of the Anti-Aliasing Prefiltering on the Measurement of MTIE", *Proc. of IEEE GLOBECOM '97*, Phoenix, AZ, USA, Nov. 1997.
35. S. Bregni, P. Tavella, "Estimation of the Percentile Maximum Time Interval Error of Gaussian White Phase Noise", *Proc. of IEEE ICC '97*, Montreal, Canada, June 1997.
36. S. Bregni, L. Valtriani, F. Veghini, "Simulation of Clock Noise and AU-4 Pointer Action in SDH Equipment", *Proc. of IEEE GLOBECOM '95*, Singapore, Nov. 1995.
37. S. Bregni, "Facing up to Practical Measurement of MRTIE: a New Effective Methodology", *Proc. of IEEE ICC '95*, Seattle, USA, 1995.
38. R. Bonello, S. Bregni, M. Carbonelli, A. Manzalini, A. Mariconda, D. De Seta, D. Perucchini, L. Valtriani, "Preliminary Experimental Results for the Development of the New Italian Synchronization Network", *Proc. of IEEE ICC '95*, Seattle, USA, June 1995.
39. S. Bregni, M. Carbonelli, D. De Seta, D. Perucchini, G. Zampilloni, "Clock Stability Measure Dependence on Time Error Sampling Period", *Proc. of IEEE GLOBECOM '94*, S. Francisco, USA, Nov. 1994.
40. S. Bregni, M. D'Agrosa, L. Valtriani, "Jitter Testing Technique and Results at the Desynchronizer Output of SDH Equipment", *Proc. of IEEE Instrumentation and Meas. Technology Conference*, Hamamatsu, Japan, May 1994.
41. S. Bregni, M. D'Agrosa, L. Valtriani, "SDH Equipment Testing: an Italian Experience towards Standard Test Specifications", *Proc. of IEEE Instrumentation and Meas. Technology Conference*, Hamamatsu, Japan, May 1994.
42. S. Bregni, M. Carbonelli, D. De Seta, D. Perucchini, "Impact of Slave Clock Internal Noise on Allan Variance and Root Mean Square Time Interval Error Measurement", *Proc. of IEEE Instrumentation and Meas. Technology Conference*, Hamamatsu, Japan, May 1994.
43. S. Bregni, L. Valtriani, "Synchronization for the Global Telecommunication Network: a Fundamental Requirement" (invited paper), *Proc. of 8<sup>th</sup> European Frequency and Time Forum*, Monaco, Germania, March 1994.
44. S. Bregni, M. Carbonelli, M. D'Agrosa, D. De Seta, D. Perucchini, "Different Behaviour of Frequency Stability Measures in Independent and Synchronized Clocks: Theoretical Analysis and Measurement Results", *Proc. of IEEE ICC '94*, New Orleans, USA, 1994.
45. S. Bregni, L. Valtriani, A. Manzalini, "A Practical Estimate Methodology for MRTIE and Related Issues", *Proc. of IEEE GLOBECOM '93*, Houston, USA, Nov. 1993.
46. S. Bregni, P. Zolzettich, "An Algorithm for a Policing Device in ATM Networks", *Proc. of 1990 International Symposium on Information Theory and its Applications (ISITA '90)*, Waikiki, Hawaii, USA, Nov. 1990.

#### **Contributions to International Standard Bodies**

1. S. Bregni, "Considerations on Definition and Specification of Frequency Accuracy and Frequency Drift", ETSI TM3 WG6, Oslo, 1993.
2. S. Bregni, "Definitions of Frequency Accuracy and Frequency Drift to Be Included in G.810", ITU-T Q21/13 Exp. Meeting, Roma, 1993.
3. S. Bregni, "AVAR, MAVAR, TVAR, TIErms Measurement Results on SDH Equipment", ETSI TM3 WG6, Montpellier, Feb. 1994.
4. S. Bregni, "Considerations on the Short Term Stability Measurements", ETSI TM3 WG6, Montpellier, Feb. 1994.
5. S. Bregni, "Some Considerations on Practical Measurement of Maximum Relative Time Interval Error (MRTIE)", ETSI TM3 WG6, Montpellier, Feb. 1994.
6. S. Bregni, "Proposed Changes to DE/TM-3017", ETSI TM3 WG6, Ipswich, June 1994.