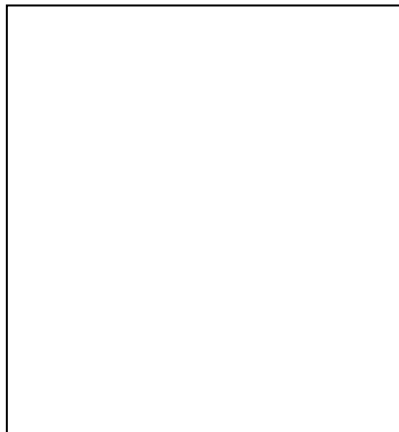


Personal information form for Fellow members of EAMBES



Personal Info

Name: **Anna M. Bianchi**

Gender: **F**

Date and place of birth: **March, 14th 1962, Codogno (LO), Italy**

Present affiliations and functions: **Politecnico di Milano, Associate Professor**

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Short CV

1987	Master Degree in Electronic Engineering at the Politecnico di Milano
1987-1989	Research fellow, IRCCS S. Raffaele Hospital, Milano
1990-2000	Research assistant, IRCCS S. Raffaele Hospital, Milano
2001-2010	Assistant Professor at the Department of Bioengineering of the Politecnico of Milano

Associate Editor of the IEEE Transactions on Biomedical Engineering,

Reviewer of international journals on Biomedical Engineering, including (but not limited to)

- IEEE Transactions on Biomedical Engineering,
- IEEE Transactions on Information Technology in Biomedicine
- Medical and Biological Engineering and Computing
- Clinical Neurophysiology
- Annales of Biomedical Engineering,
- Institute of Physics Publishing,
- Transaction of the institute of measurement & control.

The research interests are mainly related to the processing of biomedical signals aimed to improve the information content, achieve new relevant information through proper methodological techniques, define new interpretative models of the biological systems and phenomena under examination.

In particular Anna M. Bianchi worked on parametric models applied to the description and interpretation of the signals related to the cardiovascular and the neurosensorial systems. The study of the models was extended to the multivariate form in order to put into evidence interrelations among signals and subsystems. In the analysis of the beat-to-beat variability in cardiovascular signals, cardiorespiratory coupling in physiological and pathological conditions is one of the applications.

Other applications in the cardiovascular field, are mainly focused on control models of the principal variables and the autonomic regulation (heart rate, blood pressure, respiration, etc.). In the study of the neurosensorial system, the multiparametric models have been applied to the estimation of the single sweep responses of the evoked potentials, in single and multichannel EEG recordings (EEG and EP mapping) In addition, multivariate models have been developed for the quantification of mutual interactions of signals, such as multi-channel EEG recordings, in order to estimate the information flow in the brain and to explore the mechanisms underlying cognitive and motor processes.

In order to deal with non-stationary conditions, very common in biological system, and for providing an interpretation of transient phenomena, time-frequency and time-variant approaches implementation of the parametric models have been studied. The theoretical aspects were faced first, including different methodologies related to the time-frequency and time-scale representation of the signals: adaptive parametric models, time-frequency distributions, wavelet decomposition, empirical mode

decomposition. In the cardiovascular fields this allowed the study of the mechanisms underlying the vasovagal syncope, the response to drug infusion, the transition among sleep stages and, in general, were applied in the studies of the dynamical behavior of the cardiovascular system.

In the neurosensorial field the time-frequency analysis was used for the evaluation of the dynamical interactions in the EEG channels in particular situations such as learning, attention, anesthesia, motor tasks in normal subjects and in patients affected by epilepsy, dyslexia or other disfunctions.

Indices of non-linear synchronization have also been developed (entropy parameters, and long term correlation analysis, bispectral and cross-bispectral indices, clustering parameters, etc.).

Recently synchronization analysis was extended to the study of the temporal evolution of the BOLD signals extracted from fMRI acquisitions, in language studies and in epilepsy for the estimation of the effective connectivity according to the Granger approach.

Techniques of multimodal integration for the data and image fusion are another topic of the research with application in the functional investigation of the brain. In particular methodology have been developed for the fusion of multichannel EEG, anatomical MRI, functional MRI, NIRS (Near InfraRed Spectroscopy) data in different physiological and pathological conditions.

Part of the research is also focused on the interactions between the central nervous system and the autonomic nervous system, with specific application to sleep studies and to cognitive tasks.

Journal publications: 71 papers on peer reviewed journals;

Total citations: 1627

Hirsch Factor: 22 (Google Scholar)

Number of patents: 1

Relevant publications:

1. **A. Bianchi, M.**, L. Mainardi, T., E. Petrucci, M. Signorini, G., M. Mainardi, and S. Cerutti, Time-variant power spectrum analysis for the detection of transient episodes in HRV signal *IEEE Trans. on Biom. Eng.* vol. 40, pp. 136-144, 1993. ISSN: 0018-9294
2. U. Scholz, J., **A. Bianchi, M.**, S. Cerutti, and S. Kubicki, Vegetative background of sleep: spectral analysis of the heart rate variability *Phys. & Behav.* vol. 62, pp. 1037-1043, 1997. ISSN: 0031-9384
3. Priori A, Foffani G, Pesenti A, Tamma F, Bianchi AM, Pellegrini M, Locatelli M, Moxon KA, Villani RM, Rhythm-specific pharmacological modulation of subthalamic activity in Parkinson's disease, *Exp Neurol.* 2004 Oct;189(2):369-79. ISSN: 0014-4886
4. S. Marceglia, **A. M. Bianchi**, G. Baselli, G. Foffani, F. Cogiamanian, N. Modugno, S. Mrakic-Sposta, A. Priori, S. Cerutti, Interaction between rhythms in the human basal ganglia: application of bispectral analysis to local field potentials *IEEE Trans. On Neural Sys. and Rehab. Eng.*, 2007 vol. 15(4), pp 483-92. ISSN: 1534-4320

Recognitions:

PMEA Martin Black award for the best article published in *Physiological Measurements* in 2010, for the paper: MENDEZ M.O, CORTHOUT J., VAN HUFFEL S., MATTEUCCI M., PENZEL T., CERUTTI S., **BIANCHI A.M.** (2010). Automatic screening of obstructive sleep apnea from the ECG based on empirical mode decomposition and wavelet analysis. *Physiol. Measurements*, vol. 31; p. 273-289, ISSN: 0967-3334
