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MATHEMATICAL, PHYSICAL AND ENGINEERING SCIENCES

Uncovering brain–heart information through advanced signal and image processing

A theme issue compiled and edited by Gaetano Valenza, Nicola Toschi and Riccardo Barbieri

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About this issue

Through their dynamical interplay, the brain and heart ensure fundamental homeostasis and mediate a number of physiological functions as well as their disease-related aberrations. Although a vast number of ad-hoc analytical and computational tools have been recently applied to the non-invasive characterization of brain and heart dynamics, little attention has been devoted to combining information to unveil the interactions between these two physiological systems. This theme issue collects contributions from leading experts dealing with the development of advanced analytical and computational tools in the field of biomedical signal and image processing. It includes perspectives on recent advances in 7T Magnetic Resonance Imaging (MRI) as well as Electroencephalogram (EEG), Electrocardiogram (ECG) and cerebrovascular flow processing, with the specific aim of elucidating methods to uncover novel biological and physiological correlates of brain-heart physiology and physio-pathology.

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