**Biography**

Dr. Ludovico Minati has a multidiscriplinary background in engineering, physics and neuroscience. He is presently visiting professor at TokyoTech, visiting professor at the Polish Academy of Science, guest fellow at the University of Trento (Italy), and freelance consultant. His main areas of interest are non-linear dynamics of neural and electronic circuits, applications of signal processing and pattern recognition, and robotics.

## Remote synchronization in an experimental ring of non-linear oscillators: relevance for modelling brain functional connectivity

**Abstract:**
The emergence of remote synchronization in a ring of 32 non-linear oscillators is discussed. Collective behaviour of the network is investigated numerically and experimentally, based on a custom-designed circuit board featuring 32 field-programmable analog arrays. A diverse set of synchronization patterns is observed depending on the control parameters. In certain cases, amplitudes delineate subsets of non-adjacent but preferentially synchronized nodes; this cannot be trivially explained by synchronization paths along sequences of structurally connected nodes and is therefore interpreted as representing a form of remote synchronization. Complex topology of functional synchronization thus emerges from underlying elementary structural connectivity as observed in the brain. The reconstructed functional synchronization depends on the metric utilized. The implications for understanding and measuring brain functional connectivity are discussed.