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Special Issue on Nonlinear Dynamics and Synchronization

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Nonlinear dynamics is a concern of high importance as the behavior of most real- world systems and their motions are nonlinear and evolve in time and/or space. This is true for various types of systems: engineered systems, natural systems, social life events and phenomena. Nonlinear dynamic systems may display a series of behaviors: regular or irregular, stable or unstable, periodic or multi-periodic, torus or chaotic behaviors, etc....

The modeling of nonlinear dynamic systems is an important issue. The related challenge lies in finding mathematical, physical or logical representation describing the dynamical behavior and thus providing insights in the functioning principles. This is generally achieved through simulations and/or experiments.

Synchronization can be understood as the result of the adjustment of a given property of the motion exhibited by coupled systems or subsystems (either equivalent or nonequivalent). This adjustment is generally achieved under some suitable values of the control parameters e.g. couplings or the external excitation. To date, various types of synchronization have been identified: complete synchronization (CS) or identical synchronization (IS), phase synchronization (PS), lag synchronization (LS), generalized synchronization (GS), and rhythm synchronization (RS). The use of each of these types of synchronization depends upon a specific field of interest. In traffic control for instance, the phase synchronization of different lights aids to optimize through-output while in the field of mechanics or electro-mechanics, the complete synchronization is exploited to make different sub-systems or coupled systems performing identical tasks. To date, the relevant literature has also intensively addressed the exploitation of chaotic synchronization in securing digital communications and in chaos-based cryptography as well.

This special issue calls for contributions containing original recent progress research and results addressing different issues related to nonlinear dynamics and synchronization. Both theoretical works and those rather addressing specific applications are welcome.

Contributions (maximum of 15-18 pages) are expected from multiple interdisciplinary fields. Topics of interest include, but are not limited to, the following:

- Nonlinear systems and synchronization
- Theoretical fundamentals of synchronization
- Experiments of nonlinear dynamics and/or synchronization
- Simulation of nonlinear dynamics and synchronization
- Applications of nonlinear dynamics and synchronization;

Examples of Systems:

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| ▪ Self-organized transportation systems | ▪ Self-reconfigurable systems |
| ▪ Traffic management | ▪ Self-healing systems |
| ▪ Cybernetics | ▪ Oscillatory systems |
| ▪ Systems control | ▪ Communications systems |
| ▪ Robotics | ▪ Security and cryptography |
| ▪ Signal processing | ▪ Bio-computing and bio-chemistry |
| ▪ Image and video processing | ▪ Social sciences and economy |
| ▪ Supply chains and logistics systems | ▪ Analog computing systems and/or platforms |
| ▪ Production systems | ▪ etc. |

Submission procedure:

Manuscript should conform to the standard IEEE paper formatting guidelines. Prospective authors should submit an electronic copy of their complete manuscript per **Email** by

September 15, 2008. All submitted papers will be reviewed by at least three independent reviewers.

Important Dates:

Manuscript submission deadline:	September 30, 2008
Notification of final decision:	November 10, 2008
Final manuscript due:	November 30, 2008
Publication of special issue:	End of December 2008 or 1st Quarter 2009

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