

Call for Papers:

Springer's Cognitive Computation

Special Issue on
**Advances in Biologically Inspired Reservoir
Computing**

Guest Editors:

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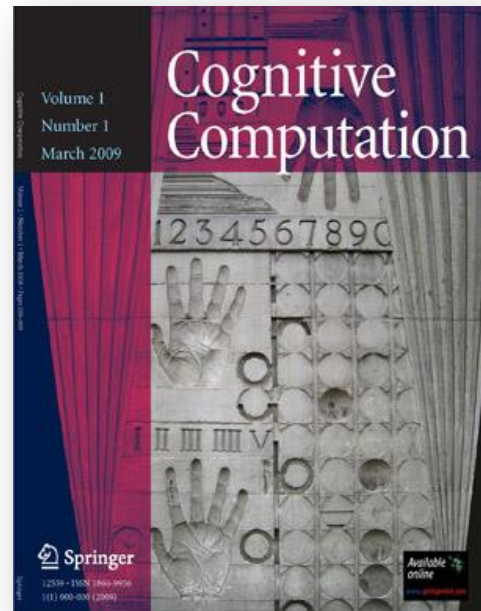
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Reservoir computing is a family of techniques for training and analyzing recurrent neural networks, wherein the recurrent portion of the network is assigned before the training process, typically via stochastic assignment of its weights. The non-linear reservoir acts as a high-dimensional kernel space, which generates complex dynamics characterized by sharp transitions between ordered and chaotic regimes. The behavior of this model emulates the functioning of many biological (complex) systems, among which the brain.

Driven by the conceptual simplicity of the reservoir and by links with neuroscience, computer science and systems' theory, researchers have achieved remarkable breakthroughs, both in theory and in practice. These include dynamical models for explaining the working behavior of reservoirs, unsupervised strategies for the adaptation of the network, and the design of unconventional computing architectures for its execution.

The recent upsurge of interest in fully adaptable recurrent networks, far from shifting the attention from the field, has brought renewed interest in reservoir computing models. In our era of extreme computational power and sophisticated problems, it is essential to understand the limits and the potentialities of simple (both deterministic and random) collections of processing units. For this reason, many fundamental questions remain open, including the design of optimal task-dependent reservoirs in a stable fashion, novel investigations on the memory and power capabilities of reservoir devices, and their applicability in an ever-increasing range of domains.

In light of this, the aim of this special issue is to provide a unified platform for bringing forth and advancing the state-of-the-art in reservoir computing approaches. Researchers are invited to submit innovative works on the theory and implementation of this family of techniques, in order to provide an up-to-date overview on the field.

Topics include (but are not limited to):

- Theoretical analyses on the computational power of reservoir computing.
- Deep reservoir models.
- Techniques for the automatic adaptation of the reservoir and the readout.
- Supervised, unsupervised and semi-supervised training criteria.
- Non-conventional substrates for the implementations of reservoirs.
- Parallel and distributed algorithms for reservoir computing.
- Comparisons between reservoir computing and standard (deep) neural networks.
- Reservoir computing for reinforcement learning problems.
- Fundamental links between reservoir computing and neuroscientific findings.
- Investigation of reservoir dynamic in a phase space of reduced dimensionality.

Applicative papers in all areas (including robotics, industrial control, etc.) are welcome, as well as outstanding surveys on specific aspects of the field.

Important Dates:

Submissions Deadline:	30 September 2016
First notification of acceptance:	30 November 2016
Submission of revised papers:	15 January 2017
Final notification to the authors:	31 January 2017
Submission of final/camera-ready papers:	15 February 2017
Approximate Publication of special issue:	mid-late 2017

Submission Requirements:

All papers should follow the manuscript preparation requirements for the Springer Cognitive Computation submissions, see <http://www.springer.com/biomed/neuroscience/journal/12559>. The authors are requested to submit their manuscripts via the online submission manuscript system, available at <http://www.editorialmanager.com/cogn/>. During submission, authors should explicitly choose the title of the special issue in the Subject line.

Should there be any further enquiries, please feel free to address them to the lead guest editor:

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