

## Symposium on Foundations of Computational Intelligence

Athens, Greece, 6-9 December, 2016

<http://ssci2016.cs.surrey.ac.uk/FOCI.htm>

## CALL FOR PAPERS

The 2016 IEEE Symposium on Foundations of Computational Intelligence (FOCI 2016) will take place in Athens, Greece as part of the IEEE Symposium Series on Computational Intelligence (SSCI 2016).

Computational intelligence techniques are widely used to tackle real-world problems due to their numerous successful applications. However, the reasons behind these successes are often not well understood. A solid theoretical foundation of computational intelligence techniques explains the reasons behind the success of these methods. Furthermore, theoretical analyses lead to the understanding of which problems are solved efficiently by a given technique and which are not. Amongst the benefits to practitioners a solid theoretical understanding (a) provides guidance on the choice of the best technique for the problem at hand, (b) helps to identify optimal parameter settings and ultimately (c) aids the design of more effective techniques.

IEEE FOCI'16 will focus on fundamental theoretical foundations of (but not limited to) the three main branches of computational intelligence, Neural Networks and other machine learning methods, Fuzzy Logic and Evolutionary Computation. Although the symposium's main interest is in theoretical foundations, computational studies of a foundational nature are also welcome. As in the previous SSCI editions, accepted papers will be included in the Conference Proceedings Citation Index. IEEE FOCI'16, provides an ideal forum for those who are interested in the foundational issues of computational intelligence to exchange their ideas and present their latest findings. Participants of FOCI'16 will also benefit from the interaction at one location with the participants of the several other symposia running concurrently at IEEE SSCI 2016, each highlighting various aspects of computational intelligence. As a whole, this international event will attract top researchers, practitioners, and students from around the world to discuss the latest advances in the field of computational intelligence.

### SPECIAL SESSIONS

*Emerging Techniques in Computational Intelligence.* Organizer: S. Aggarwal

*Unconventional Computing: From Concepts to Prototypes.* Organizers: A. Adamatzky, G. Sirakoulis

### NON-EXCLUSIVE LIST OF TOPICS

#### Evolutionary Computation

- Theoretical foundations of bio-inspired heuristics
- Exact and approximation runtime analysis
- Fixed budget computation
- Black box complexity
- Self-adaptation
- Population dynamics
- Fitness landscape analysis
- No free lunch theorems
- Statistical approaches
- Computational studies of a foundational nature

#### Fuzzy Logic

- Non-Standard fuzzy sets
- Granular computing
- Computing with words
- Aggregation / fusion
- Fuzzy sets and statistics
- Uncertainty
- Decision making
- Fuzzy set theory
- Lattice theory
- Multi-valued logic
- Approximate reasoning
- Type-2 fuzzy logic
- Rough sets
- Random sets
- Fuzzy mathematics
- Fuzzy measure and integral
- Possibility theory and imprecise probability
- Generalization

#### Machine Learning

- Neural computation
- Self-organizing maps
- Recurrent networks
- Multi-layer perceptrons
- Reinforcement learning
- Evolutionary NN
- NN for pattern recognition
- NN for prediction & optimization
- NN for principal component analysis
- Recursive deterministic perceptrons
- General regression NN
- NN as fuzzy systems
- Radial basis functions
- Learning theory
- Generalisation

### Important Dates

**Paper Submission:** Jul 18, 2016

**Notification to authors:** Sep 12, 2016

**Final Submission:** Oct 10, 2016

### Symposium Co-Chairs

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