

# Preface

We are proud to present the set of final accepted papers for the 13th edition of IWANN – the International Work-Conference on Artificial Neural Networks – held in Cadiz, Spain, during June 14–16, 2017.

IWANN is a biennial conference that seeks to provide a discussion forum for scientists, engineers, educators, and students about the latest ideas and realizations in the foundations, theory, models, and applications of hybrid systems inspired by nature (neural networks, fuzzy logic, and evolutionary systems) as well as in emerging areas related to these areas. As in previous editions of IWANN, this year’s event also aimed to create a friendly environment that could lead to the establishment of scientific collaborations and exchanges among attendees. The proceedings include all the presented communications to the conference. The publication of an extended version of selected papers in a special issue of several specialized journals (such as *Neurocomputing*, *Soft Computing*, and *Neural Processing Letters*) is also foreseen.

Since the first edition in Granada (LNCS 540, 1991), the conference has evolved and matured. The list of topics in the successive call for papers has also evolved, resulting in the following list for the present edition:

1. Mathematical and theoretical methods in computational intelligence. Mathematics for neural networks. RBF structures. Self-organizing networks and methods. Support vector machines and kernel methods. Fuzzy logic. Evolutionary and genetic algorithms.
2. Neurocomputational formulations. Single-neuron modelling. Perceptual modelling. System-level neural modelling. Spiking neurons. Models of biological learning.
3. Learning and adaptation. Adaptive systems. Imitation learning. Reconfigurable systems. Supervised, non-supervised, reinforcement and statistical algorithms.
4. Emulation of cognitive functions. Decision-making. Multi-agent systems. Sensor mesh. Natural language. Pattern recognition. Perceptual and motor functions (visual, auditory, tactile, virtual reality, etc.). Robotics. Planning motor control.
5. Bio-inspired systems and neuro-engineering. Embedded intelligent systems. Evolvable computing. Evolving hardware. Microelectronics for neural, fuzzy and bioinspired systems. Neural prostheses. Retinomorphic systems. Brain–computer interfaces (BCI). Nanosystems. Nanocognitive systems.
6. Advanced topics in computational intelligence. Intelligent networks. Knowledge-intensive problem-solving techniques. Multi-sensor data fusion using computational intelligence. Search and meta-heuristics. Soft computing. Neuro-fuzzy systems. Neuro-evolutionary systems. Neuro-swarm. Hybridization with novel computing paradigms.
7. Applications. Expert systems. Image and signal processing. Ambient intelligence. Biomimetic applications. System identification, process control, and manufacturing. Computational biology and bioinformatics. Parallel and distributed computing. Human–computer interaction, Internet modelling, communication and networking.

Intelligent systems in education. Human–robot interaction. Multi-agent systems. Time series analysis and prediction. Data mining and knowledge discovery.

At the end of the submission process, and after a careful peer review and evaluation process (each submission was reviewed by at least two, and on average 2.8, Program Committee members or additional reviewers), 126 papers were accepted for oral or poster presentation, according to the recommendations of the reviewers and the authors' preferences.

It is important to note, that for the sake of consistency and readability of the book, the presented papers are not organized as they were presented in the IWANN 2017 sessions, but classified under 21 chapters. The organization of the papers is in two volumes, arranged according to the topics list included in the call for papers. The first volume (LNCS 10305), entitled “Advances in Computational Intelligence. IWANN 2017. Part I” is divided into nine main parts and includes the contributions on:

1. Bio-inspired Computing
2. E-Health and Computational Biology
3. Human–Computer Interaction
4. Image and Signal Processing
5. Mathematics for Neural Networks
6. Self-Organizing Networks
7. Spiking Neurons
8. Artificial Neural Networks in Industry, ANNI 2017 (Special Session, organized by: Dr. Ahmed Hafaifa, Dr. Kouzou Abdellah, and Dr. Guemana Mouloud)
9. Machine Learning for Renewable Energy Applications (Dr. Sancho Salcedo Sanz, and Dr. Pedro Antonio Gutiérrez)

In the second volume (LNCS 10306), entitled “Advances in Computational Intelligence. IWANN 2017. Part II” is divided into 12 main parts and includes the contributions on:

1. Computational Intelligence Tools and Techniques for Biomedical Applications (Special Session, organized by: Dr. Miguel Atencia, Dr. Leonardo Franco, and Dr. Ruxandra Stoean)
2. Assistive Rehabilitation Technology (Special Session, organized by: Dr. Oresti Baños and Dr. Jose A. Moral-Muñoz)
3. Computational Intelligence Methods for Time Series (Special Session, organized by: Dr. German Gutierrez and Dr. Héctor Pomares)
4. Machine Learning Applied to Vision and Robotics (Special Session, organized by: Dr. José García-Rodríguez, Dr. Enrique Dominguez, Mauricio Zamora, and Dr. Eldon Caldwell)
5. Human Activity Recognition for Health and Well-Being Applications (Special Session, organized by: Dr. Daniel Rodríguez-Martín and Dr. Albert Samà)
6. Software Testing and Intelligent Systems (Special Session, organized by: Dr. Manuel Núñez and Pablo Cerro Cañizares)
7. Real-World Applications of BCI Systems (Special Session, organized by: Dr. Ricardo Ron and Dr. Ivan Volosyak)

8. Machine Learning in Imbalanced Domains (Special Session, organized by: Dr. Jaime S. Cardoso and Dr. María Pérez Ortíz)
9. Surveillance and Rescue Systems and Algorithms for Unmanned Aerial Vehicles (Special Session, organized by: Dr. Wilbert Aguilar)
10. End-User development for Social Robotics (Special Session, organized by: Igor Zubrycki, Hoang-Long Cao, and Dr. Emilia Barakova)
11. Artificial Intelligence and Games (Special Session, organized by: Dr. Antonio J. Fernández-Leiva, Dr. Antonio Mora-García, and Dr. Pablo García Sánchez)
12. Supervised, Non-supervised, Reinforcement and Statistical Algorithms

In this edition of IWANN 2017, we were honored to have the following invited speakers:

- Dr. Matthias Rauterberg, Technische Universiteit Eindhoven, The Netherlands: “How to Design for the Unconscious”
- Prof. Ulrich Rückert, Bielefeld University, Germany: “Cognitronics: Resource-efficient Architectures for Cognitive Systems”
- Prof. Le Lu, U.S. National Institutes of Health, USA: “Towards Big Data, Weak Label and True Clinical Impact on Medical Image Diagnosis: The Roles of Deep Label Discovery and Open-Ended Recognition”

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Ignacio Rojas  
Gonzalo Joya  
Andreu Catala

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