

Preface

This volume is part of the two-volume proceedings of the 26th International Conference on Artificial Neural Networks (ICANN-2017), held during September 11–14, 2017 in Alghero, Italy. ICANN 2017 was organized with the support of the Department of Architecture of the University of Sassari, the Neuroheuristics Research Group of the University of Lausanne, and the European Neural Network Society (ENNS).

The ICANN conference is the flagship annual conference of the European Neural Network Society. The ICANN series of conferences was initiated in 1991 and soon became the major European gatherings of experts in the field of neural networks and related areas. The unique character of this conference is its transdisciplinarity, beyond the interdisciplinarity of machine learning, bringing together researchers from all horizons, i.e., mathematics, physics, information and computer sciences, engineering, as well as theoretical and experimental neurosciences. The conference is organized in partnership with ENNS with its governance fully committed to not-for-profit procedures that allow us to keep the congress fees low compared with international standards. This policy granted the participation of a significant number of undergraduate and master students, who accounted for 18% of the scientific delegates. The ICANN governance model consolidated the practice to include membership of ENNS, valid through December of the calendar year of the conference, for all ICANN participants who present a scientific communication. Last, but not least, two best paper awards are distributed, along with ten travel grants sponsored by ENNS.

Following the practice of the ICANN conference series since 2011, the ICANN 2017 conference was organized following a dual-track stream of oral talks lasting 20 minutes each, one track including seven sessions of mainly ANN and machine-learning-inspired presentations, and one track including seven sessions of mainly bio-inspired presentations. A tutorial on the capabilities of shallow and deep networks supported by ENNS President Vera Kurkova and a special session organized on the topic of neural networks and applications to environmental sciences were organized on the first day of the conference, before the opening of the main program. Poster sessions have always played a key role in successful ICANN conferences. This year, the time and space allocated to nine poster sessions was further expanded, and posters were left on display throughout the entire duration of the conference. The scientific program was completed by five keynote lectures from world-renowned scholars: Professor Moshe Abeles talking about temporal information in neural coding; Professor Marco Gori about the computational framework associated with the emergence of inference rules; Professor Elisabeth André about emotional intelligence in human–computer interaction; Professor David Ríos about adversarial machine learning; and Professor Michele Giugliano about information transmission in weakly coupled large-scale neural ensembles.

Out of approximately 270 papers submitted to ICANN 2017, the Program Committee selected 128 full and 63 short papers. It is interesting to note that about half of the accepted short papers were initially submitted as full papers. Although these papers did not get through the strict reviewing process for full papers, their authors prepared a short paper version for presentation at ICANN. Because of its reputation as a high-level conference, ICANN rarely receives papers of poor quality, and the fact that one third of the scientific delegates chose to submit short papers is certainly a proof of the vitality and attractiveness of the ICANN conference. The type of submission was not the ultimate criterion in assigning the submitters to an oral or a poster presentation. Short papers account for 19/79 oral presentations and 44/112 poster presentations.

The number of accepted papers necessitated publishing the proceedings in two volumes. The contributions (oral and posters) were grouped following the respective track: Volume I for Artificial Neural Networks and Biological Inspiration and Volume II for Formal Models and Their Applications. The proceedings of the short papers have been grouped, following the rules of the publisher, at the end of each volume. The presenting authors came from 33 countries all over the world: 87 from Europe, 74 from Asia, 26 from the Americas, three from Oceania and one from Africa. China (39) and Germany (33) were the most represented countries.

It is our pleasure to express our gratitude to everybody who contributed to the success of the conference and the publication of the proceedings. In particular, we thank the members of the Executive Committee of the ENNS and the president, Vera Kurkova, for entrusting us with the organization of the conference. We would like to express our sincere gratitude to the members of the Program Committee and all the reviewers, who did a tremendous job under time constraints during the review process. We thank all members of the local Organizing Committee and the local staff for the great effort and assistance in the organization of the conference, in particular, Antonello Monsù Scolaro (Department of Architecture in Alghero of the University of Sassari), Eugenio Lintas (Sassari), and Anna Mura (SPECs, Universitat Pompeu Fabra, Barcelona). We are greatly indebted to Dr. Paolo Masulli for his commitment as ENNS interim secretary and ICANN communication chair along all phases of the organization. We would also like to thank the publisher, Springer, for their cooperation during the publishing process that was under strict time limitations. Finally, we thank all authors who contributed to these volumes for sharing their ideas, their results, and their spirit with the community during the scientific and social programs of the conference. We are sure that the participants of ICANN 2017 maintained the enthusiasm of the founders of ENNS and initial organizers of the ICANN conferences and that they will continue to generate new ideas and innovative results in the field of neural networks and related areas.

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