

# Preface

This volume contains the proceedings of the 9th International Conference on Computational Collective Intelligence (ICCCI 2016), held in Halkidiki, Greece, September 28–30, 2016. The conference was co-organized by the Aristotle University of Thessaloniki, Greece, the Democritus University of Thrace, Greece, and the Wrocław University of Science and Technology, Poland. The conference was run under the patronage of the IEEE SMC Technical Committee on Computational Collective Intelligence.

Following the successes of the First ICCCI (2009) held in Wrocław, Poland, the Second ICCCI (2010) in Kaohsiung, Taiwan, the Third ICCCI (2011) in Gdynia, Poland, the 4th ICCCI (2012) in Ho Chi Minh City, Vietnam, the 5th ICCCI (2013) in Craiova, Romania, the 6th ICCCI (2014) in Seoul, South Korea, and the 7th ICCCI (2015) in Madrid, Spain, this conference continues to provide an internationally respected forum for scientific research in the computer-based methods of collective intelligence and their applications.

Computational collective intelligence (CCI) is most often understood as a sub-field of artificial intelligence (AI) dealing with soft computing methods that enable making group decisions or processing knowledge among autonomous units acting in distributed environments. Methodological, theoretical, and practical aspects of CCI are considered as the form of intelligence that emerges from the collaboration and competition of many individuals (artificial and/or natural). The application of multiple computational intelligence technologies such as fuzzy systems, evolutionary computation, neural systems, consensus theory, etc., can support human and other collective intelligence, and create new forms of CCI in natural and/or artificial systems. Three subfields of the application of computational intelligence technologies to support various forms of collective intelligence are of special interest but are not exclusive: Semantic Web (as an advanced tool for increasing collective intelligence), social network analysis (as the field targeted to the emergence of new forms of CCI), and multi-agent systems (as a computational and modeling paradigm especially tailored to capture the nature of CCI emergence in populations of autonomous individuals).

The ICCCI 2016 conference featured a number of keynote talks and oral presentations, closely aligned to the theme of the conference. The conference attracted a substantial number of researchers and practitioners from all over the world, who submitted their papers for the main track and 12 special sessions.

The main track, covering the methodology and applications of CCI, included: multi-agent systems, knowledge engineering and Semantic Web, natural language and text processing, data-mining methods and applications, decision support and control systems, and innovations in intelligent systems. The special sessions, covering some specific topics of particular interest, included cooperative strategies for decision making and optimization, meta-heuristics techniques and applications, Web systems and human-computer interaction, applications of software agents, social media and the Web of linked data, computational swarm intelligence, ambient networks, information

technology in biomedicine, impact of smart and intelligent technology on education, big data mining and searching, machine learning in medicine and biometrics, and low-resource language processing.

We received 277 submissions. Each paper was reviewed by two to four members of the international Program Committee of either the main track or one of the special sessions. We selected the 108 best papers for oral presentation and publication in two volumes of the *Lecture Notes in Artificial Intelligence* series.

We would like to express our thanks to the keynote speakers, Plamen Angelov, Heinz Koepl, Manuel Núñez, and Leszek Rutkowski, for their world-class plenary speeches. Many people contributed toward the success of the conference. First, we would like to recognize the work of the PC co-chairs and special sessions organizers for taking good care of the organization of the reviewing process, an essential stage in ensuring the high quality of the accepted papers. The workshops and special sessions chairs deserve a special mention for the evaluation of the proposals and the organization and coordination of the work of the 12 special sessions. In addition, we would like to thank the PC members, of the main track and of the special sessions, for performing their reviewing work with diligence. We thank the Organizing Committee chairs, liaison chairs, publicity chair, special issues chair, financial chair, Web chair, and technical support chair for their fantastic work before and during the conference. Finally, we cordially thank all the authors, presenters, and delegates for their valuable contribution to this successful event. The conference would not have been possible without their support.

It is our pleasure to announce that the conferences of the ICCCI series continue their close cooperation with the Springer journal *Transactions on Computational Collective Intelligence*, and the IEEE SMC Technical Committee on Transactions on Computational Collective Intelligence.

Finally, we hope that ICCCI 2016 significantly contributes to the academic excellence of the field and leads to the even greater success of ICCCI events in the future.

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