Preface

Carlos Martín-Vide[1] · Miguel A. Vega-Rodríguez[2]

This special issue of the journal *Natural Computing* contains extended versions of some of the best papers presented at the Eighth International Conference on the Theory and Practice of Natural Computing, TPNC 2019, held in Kingston, Canada on December 9–11, 2019. The conference was co-organized by the Royal Military College of Canada / Collège Militaire Royal du Canada, and the Institute for Research Development, Training and Advice, Brussels/London.

TPNC 2019 was the eighth event in a series dedicated to presenting and promoting research on the wide spectrum of computational principles, models and techniques inspired by information processing in nature. We intended to attract both theoretical and applied contributions to nature-inspired models of computation, synthesizing nature by means of computation, nature-inspired materials, and information processing in nature.

Out of 45 submissions to the conference, 18 papers were accepted (which represents an acceptance rate of 40%). Among them, the authors of 3 papers were invited to submit to this special issue. Each submission was reviewed by three independent experts and, based on their comments, the guest editors decided to accept 2 papers.

Next, we briefly present both papers included in this special issue.

Based on swarm movements and computing models using multisets, in the paper *On the Computational Power of Swarm Automata Using Agents with Position Information* Kaoru Fujioka introduces a swarm automaton to construct a new computing system with swarm behavior. In a swarm automaton, each agent changes by input and by the interaction between agents, and this leads to the change of the swarm represented by the multiset of agents. When position information for agents is introduced, the agent not only changes but also moves according to the nearby agents. A string of a language is accepted by a swarm automaton based on the position of the agents when it leads to the swarm consisting of agents on the designated position. The author shows that any recursively enumerable language is accepted by a swarm automaton with only five agents using parallel transitions.

Actively Revealing Card Attack on Card-based Protocols, by Ken Takashima, Daiki Miyahara, Takaaki Mizuki and Hideaki Sone, considers a malicious attack on card-based cryptographic protocols where an active adversary tries to obtain secret information by illegally revealing face-down cards without any hesitation. The main contribution of this study is the design of t-secure AND protocols which enable players to perform a secure computation of the logical AND function even if at most t cards are revealed illegally.

We thank you the authors for their contributions, the reviewers for their valuable work, and the editorial team of the journal for their professional support and collaboration.

✉ Miguel A. Vega-Rodríguez
  mavega@unex.es

  Carlos Martín-Vide
  carlos.martin@urv.cat

1   Research Group on Mathematical Linguistics, Rovira i Virgili University, 43002 Tarragona, Spain

2   ARCO Research Group, University of Extremadura, 10003 Cáceres, Spain