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Advances in Artificial Life, Evolutionary Computation, and Systems Chemistry

11th Italian Workshop, WIVACE 2016
Fisciano, Italy, October 4–6, 2016
Revised Selected Papers

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Preface

This volume of the Springer book series *Communications in Computer and Information Science* contains the proceedings of WIVACE 2016: the 11th Italian Workshop on Artificial Life and Evolutionary Computation, held in Salerno, Italy, during October 4–6, 2016. WIVACE was first held in 2007 in Sampieri (Ragusa), as the incorporation of two previously separately running workshops (WIVA and GSICE). After the success of the first edition, the workshop has been organized every year, aiming to offer a forum where different disciplines can effectively meet. The spirit of this workshop is to promote the communication among single research "niches" hopefully leading to surprising "cross-over" and "spill-over" effects. In this respect, the WIVACE community has been open to researchers coming from experimental fields such as systems chemistry and biology, origin of life, and chemical and biological smart networks.

WIVACE 2016 was jointly organized with BIONAM 2016, a workshop on bionanomaterials, to involve multidisciplinary research focusing on the analysis, synthesis and design, of bionanomaterials. The community of BIONAM comprises biophysicists, the biochemists, and bioengineers covering the study of the basic properties of materials and their interaction with biological systems, the development of new devices for medical purposes such as implantable systems, and new algorithms and methods for modeling the mechanical, physical, or biological properties of biomaterials. This challenging task requires powerful theoretical and computational tools to understand and control the inherent complexity of the interactions between synthetic and biological objects.

The interaction between the WIVACE and the BIONAM communities resulted in a joint session where the experimental work was harmonized in a well-established theoretical framework; some selected contributions, having a more theoretical character, have been collected in the section "Modelling and Simulation of Artificial and Biological Systems" of this volume.

The WIVACE 2016 volume is divided into two more sections: "Evolutionary Computation and Genetic Algorithms," which collects selected theoretical and computational contributions classically belonging to the WIVACE community, and "Systems Chemistry and Biology," which collects selected contributions from the interaction between informatics scientists and the biological and chemical community involved in complex systems studies. Among others, we would like to mention the contributions of two invited speakers, representative of this interaction: "Mathematical Modeling in Systems Biology" by Olli Yli-Harja and "A Strategy to Face Complexity: The Development of Chemical Artificial Intelligence" by Pier Luigi Gentili.

Events like WIVACE are generally a good opportunity for new-generation or soon-to-be scientists to get in touch with new subjects and bring new ideas to the attention of senior researchers. To highlight and promote the work of the youngest participants, we awarded ex aequo Dr. Chiara Damiani and Dr. Marcello Budroni for the best oral presentation; their contributions were selected as full papers and appear in this volume in the sections "Modelling and Simulation of Artificial and Biological

Systems" (C. Damiani et al.: "Linking Alterations in Metabolic Fluxes with Shifts in Metabolite Levels by Means of Kinetic Modeling") and "Evolutionary Computation and Genetic Algorithms" (M. Budroni et al.: "Scale-Free Networks out of Multifractal Chaos").

As editors, we wish to express gratitude to all the attendees of the conference and to the authors who spent time and effort to contribute to this volume. We also acknowledge the precious work of the reviewers and of the members of the Program Committee. Special thanks, finally, to the invited speakers for their very interesting and inspiring talks: Gabor Vattay from Eötvös Loránd University (Hungary), Nicola Segata from the University of Trento (Italy), Raffaele Giancarlo from the University of Palermo (Italy), Olli Yli-Harja from Tampere University of Technology (Finland), and Pier Luigi Gentili from University of Perugia (Italy).

The 17 papers presented were thoroughly reviewed and selected from 54 submissions. They cover the following topics: evolutionary computation, bioinspired algorithms, genetic algorithms, bioinformatics and computational biology, modelling and simulation of artificial and biological systems, complex systems, synthetic and systems biology, systems chemistry, and they represent the most interesting contributions to the 2016 edition of WIVACE.

October 2016

Federico Rossi
Stefano Piotto
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Organization

WIVACE 2016 was organized in Fisciano (SA, Italy) by the University of Salerno (Italy).

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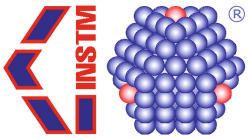
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