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# Self-Organizing Systems

7th IFIP TC 6 International Workshop, IWSOS 2013  
Palma de Mallorca, Spain, May 9-10, 2013  
Revised Selected Papers



Springer

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# Preface

This book contains the research articles that were presented at the International Workshop on Self-Organizing Systems (IWSOS) held in Palma de Mallorca, Spain, in May 2013. This was the seventh workshop in a series of multidisciplinary events dedicated to self-organization in networks and networked systems, including techno-social systems.

Self-organization relates the behavior of the individual components (the microscopic level) to the resulting networked structure and functionality of the overall system (the macroscopic level), where simple interactions at the microscopic level may already give rise to complex, adaptive, and robust behavior at the macroscopic level. On the other hand, designing self-organizing systems comes with new challenges such as their controllability, engineering, testing, and monitoring. Therefore, the IWSOS workshop series provides a highly multidisciplinary and innovative forum for researchers from different areas to exchange ideas and advance the field of self-organizing systems. The growing scale, complexity, and dynamics of (future) networked systems have been driving research from centralized solutions to self-organized networked systems. The applicability of well-known self-organizing techniques to specific networks and networked systems is being investigated, as well as adaptations and novel approaches inspired by cooperation in nature. Models originating from areas such as control theory, complex systems research, evolutionary dynamics, sociology, and game theory are increasingly applied to complex networks to analyze their behavior, robustness, and controllability. Self-organization principles not only apply to the Internet and computer networks but also to a variety of other complex networks, like transportation networks, telephony networks, smart electricity grids, financial networks, social networks, and biological networks. “Network science” and “complex networks theory” constitute new research areas that provide additional insights into self-organizing systems.

This year, we received 35 paper submissions. On the basis of the recommendations of the Technical Program Committee and external expert reviewers, we accepted 11 full papers and nine short papers. Most full papers were reviewed by four experts, and all papers received at least three reviews. The workshop featured a keynote lecture by Alessandro Vespignani on modeling and forecast of socio-technical systems, as well as two round tables on *Techno-Social Systems* and *Future Control Challenges for Smart Grids*. The papers presented in the talks addressed the topics of data dissemination, energy systems and smart grids, evolutionary algorithms, social systems, transportation networks, and wireless sensor networks.

We are grateful to all TPC members and additional reviewers who provided thorough reviews that made the selection of the papers possible. Special thanks go to our IWSOS 2013 general chairs, Maxi San Miguel and Hermann de Meer,

for their outstanding support in all the phases of the workshop organization. Additionally, thanks goes to our treasurer Bernhard Plattner, Pere Colet, who managed the local organization, and the publicity chairs, Karin Anna Hummel and Carlos Gershenson. Finally, we want to thank the authors for their submissions and contributions to the technical program.

November 2013

Wilfried Elmenreich  
Falko Dressler  
Vittorio Loreto

# Organization

IWSOS 2013, the 7th International Workshop on Self-organizing Systems, was organized by the Institute for Cross-Disciplinary Physics and Complex Systems, a joint research Institute of the University of the Balearic Islands (UIB) and the Spanish National Research Council (CSIC) on the University of Balearic Islands Campus, Palma de Mallorca, Spain, May 9–10, 2013.

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