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Proceedings of ECCS 2014

European Conference on Complex Systems

 Springer

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Foreword

In the past decade the field of Complexity Science has moved into a new stage of its life. The big data and information technology revolutions are finally providing the necessary data, numerical experiments and validation tests to the many conceptual and theoretical advances that complex systems science has already provided to a large number of scientific disciplines. These fast paced developments are augmenting complex systems science with an “applied” dimension. Our increasing capability to solve many open problems, in a large diversity of scientific fields, has made it possible that Complex Systems Science becomes one of the conceptual and methodological keys to understand and deal with important real-world challenges that range from epidemics and traffic congestions, to systemic risks and cultural evolution, to cite a few.

In this framework, it is no wonder that the Complex Systems Society, gathering all researchers engaged in complex systems research has grown and developed along the same lines. The general Society conference is annually gathering about 1,000 scientists from all disciplines and it is a meeting point where every scientist interested in complex systems research can network the collective with a vibrant research community.

The annual conference on Complex Systems of 2014, organized at the IMT School for advanced studies in Lucca, was a smashing success, breaking many records for attendance, number of presentations—more than 200—and parallel workshops. The Lucca conference is certainly a milestone in the life of the field and the Complex Systems Society. We are extremely glad to see that the chairmen of the conference Guido Caldarelli and Stefano Battiston—Chairmen of the Lucca’s conference—have teamed up with Francesco De Pellegrini and Emanuela Merelli to edit a book that collects a selection of 27 papers presented at the conference. The final result is a proceedings volume that is truly representative of the wide range of problems addressed by the community and the depth of the technical approaches used to tackle them. It speaks loudly for itself and we are sure that it will also become a reference for those that want to grasp what the community is doing nowadays.

On behalf of the Complex Systems Society and its members we thank the organizers of the conference and the editors of this Proceedings of ECCS 2014 for all their work, the exemplary engagement and their service to Complex Systems Science.

Alessandro Vespignani
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Boston, MA, USA

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Preface

This volume collects a series of multidisciplinary contributions in the field of complex systems science. Several works presented in this collection pivot on the theory and applications of formal and computational approaches. These methods are suitable to construct and simulate models of complex systems so as to analyse their properties. This is indeed an emerging research area encompassing a broad range of fields including—but not limited to—physics, computer science and mathematics, economics, business, political science, biology, sociology, neuroscience and medicine. The collection is thus addressed to the new generation of transdisciplinary researchers.

The work contains contributions which have been initially discussed in the *European Conference on Complex Systems* (ECCS'14) held at IMT, Lucca from 22 to 26 September 2014, under the sponsorship of the Complex Systems Society. ECCS'14 is a major international conference in the area of Complex Systems and interdisciplinary science in general. The main aim is to offer unique opportunities to study novel foundational approaches in a multitude of application areas. Thus, it spans from Complexity in ICT and Social Systems, to Complexity in Infrastructures, Complexity in Environment and Cities, Complexity in Natural Sciences, Complexity in Humanities, Linguistics and Society Complexity in Economics and Finance.

The project had an internal call for papers presented at the ECCS14 Conference. It contains a selection of 27 papers which originated from the conference oral presentations and poster sessions. All the manuscripts are extended versions of the contributions presented there and went through an independent review process.

The editors express their thanks to all authors of the articles submitted to this special issue. They also acknowledge the efforts of our many reviewers for their help in selecting the papers published in this special issue.

Zürich, Switzerland
Trento, Italy
Lucca, Italy
Camerino, Italy

Stefano Battiston
Francesco De Pellegrini
Guido Caldarelli
Emanuela Merelli

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