ICSIT 2023

The 14th International Conference on Society and Information Technologies

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PROCEEDINGS

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ICSIT 2023

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in the context of the 14th International Conference on Society and Information Technologies: ICSIT 2023

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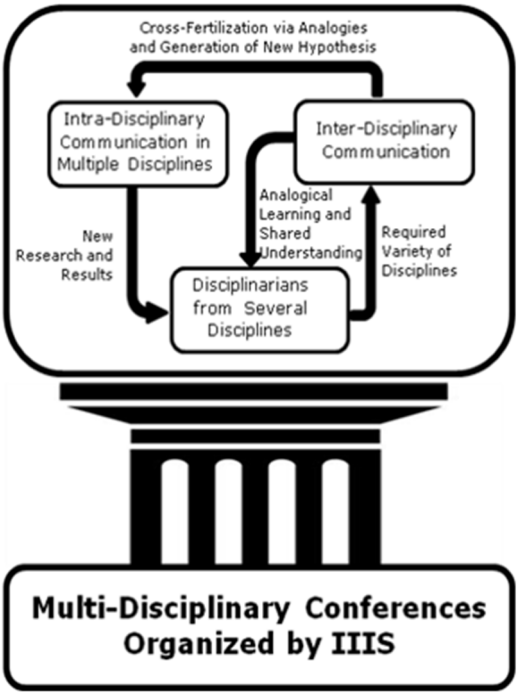
FOREWORD

Our purpose in organizing the 14th International Multi-Conference on Complexity, Informatics and Cybernetics (IMCIC 2023) jointly with the 14th International Conference on Society and Information Technologies (ICSIT 2023) and their collocated events, including the 13th Ibero-American Conference on Complexity, Informatics and Cybernetics (CICIC 2023), is to provide a multi-disciplinary forum for both disciplinary and inter-disciplinary communication.

These collocated events were organized and sponsored by the International Institute of Informatics and Systemics (IIIS, www.iiis.org), member of the International Federation for Systems Research (IFSR, www.ifsr.org). The IIIS is a **multi-disciplinary organization for inter-disciplinary communication and integration**, which includes about 5000 members. Consequently, a main purpose of the IIIS is to foster knowledge integration processes, interdisciplinary communication, and integration of academic activities. Based on: 1) the transdisciplinarity of the systemic approach and its emphasis on *relationships* and *integrating* processes, and 2) the multi-disciplinary support of cybernetics' and informatics' concepts, notions, theories, technologies, and tools, the IIIS has been organizing multi-disciplinary conferences as a platform for fostering inter-disciplinary communication and knowledge integration processes.

Multi-disciplinary conferences are organized by the IIIS as support for both **intra-** and **inter-disciplinary** communication. Processes of intra-disciplinary communication are mainly achieved via traditional paper presentations in corresponding disciplines, while conversational sessions, regarding trans- and inter-disciplinary topics, are among the means used for inter-disciplinary communication. Intra- and inter-disciplinary communications might generate *co-regulative cybernetic loops*, via negative feedback, and *synergic* relationships, via positive feedback loops, in which both kinds of communications could increase their respective effectiveness. Figure (at the right side) shows at least two cybernetic loops if intra- and inter-disciplinary are adequately related. A necessary condition for the effectiveness of Inter-disciplinary communication is an adequate level of **variety** regarding the participating disciplines. *Analogical thinking and learning processes* of disciplinarians depend on it; which in turn are potential sources of the creative tension required for cross-fertilization among disciplines and the generations of new hypothesis. An extended presentation regarding this issue can be found at http://www.iiis.org/MainPurpose/



In general, IIIS is an organization dedicated to contributing to the development of the Systems Approach, Cybernetics, and Informatics potential, using both: knowledge and experience, thinking and action, for the:

a. identification of synergetic relationships among Systemics, Cybernetics and Informatics, and between them and society;
b. promotion of contacts among the different academic areas, through the transdisciplinarity of the systems approach;

c. identification and implementation of communication channels among the different professions;
d. supply of communication links between the academic and professional worlds, as well as between them and the business world, both public and private, political and cultural;
e. stimulus for the creation of integrative arrangements at different levels of society, as well as at the family and personal levels;
f. promotion of transdisciplinary research, both on theoretical issues and on applications to concrete problems.

Our objective organizing the 14th International Multi-Conference on Complexity, Informatics and Cybernetics (IMCIC 2023) is to provide, in these increasingly related areas, a multi-disciplinary forum, to foster interdisciplinary communication among the participants, and to support the sharing process of diverse perspectives of the same transdisciplinary concepts and principles. Complexity, Cybernetics and Informatics are being increasingly related to each other in almost every scientific discipline, engineering area, and human activity. Their common transdisciplinarity characterizes and communicates them, generating strong relations among them and with other disciplines. They work together to create a whole new way of thinking and practice. This phenomenon persuaded the Organizing Committee to structure IMCIC 2023 as a multi-conference where participants may focus on one area, or on one discipline, while allowing them the possibility of attending events from other areas or disciplines. This systemic approach stimulates cross-fertilization among different disciplines, inspiring scholars, originating new hypothesis, supporting production of innovations and generating analogies; which is, after all, one of the very basic principles of the systems' movement and a fundamental aim in cybernetics.

One of the main objectives of the 14th International Conference on Society and Information Technologies (ICSIT 2023) and the 14th International Conference on Education, Training and Informatics (ICETI 2023) is to bring together academics, professionals, and managers from the private and the public sectors, so they can share ideas, results of research, and innovative services or products, in a multi-disciplinary and multi-sector forum.

Educational technologies, socio-economic organizations, and socio-political processes are essential domains among those involved in the evolving co-adaptation and co-transformation between societies and cultures on the one hand, and between informatics and cybernetics (communication and control) on the other hand.

ICSIT 2023 and ICETI 2023 are related to each other, as well as to IMCIC 2023 and, as a whole, are producing or might produce synergic relationships with Information and Communication Technologies. This is why the Organizing Committees have the purpose of combining their efforts in a way that would lead to the organization of an adequate joint event, where academics, researchers, consultants, professionals, innovators, and practitioners from the three areas might relate and interact with each other in the same event. These types of interaction might generate possibilities of cross-fertilization and analogical thinking, as well as possibilities of new working hypothesis, ideas, and reflections on the impact, significance, and usefulness of Informatics and Cybernetics in important dimensions of educational, socio-political, and socio-economical processes, services, and products.

On behalf of the Organizing Committee, I extend our heartfelt thanks to the Program Committees' members, to the 376 reviewers, from 65 countries, who made the **double-blinded** reviews, and to the 154 reviewers, from 35 countries, who made the **non-blind** reviews. (Some reviewers supported both: non-blind and double-blind reviewing for different submissions). A total of 1041 reviews made by 530 reviewers (who made at least one review), from 71 countries contributed to the quality achieved in IMCIC/ICETI/CICIC 2023. This means an average of **6.02 reviews per submission** (173 submissions were received). Each registered author had access, via the conference web site, to the reviews that recommended the acceptance of their respective submissions. Each registered author could get information about: 1) the average of the reviewers' evaluations according to 8 criteria, and the average of a global evaluation of his/her submission; and 2) the comments and

the constructive feedback made by the reviewers, who recommended the acceptance of his/her submission, so the author would be able to improve the final version of the paper.

In the organizational process of IMCIC/ICSIT 2023, about 104 articles were submitted. The IMCIC/ICSIT 2023 proceedings include about 62 papers from 23 countries (41 papers from IMCIC and 21 papers from ICSIT), which were accepted for presentation. *The submissions were reviewed as carefully as time permitted; it is expected that most of them will appear in a more polished and complete form in scientific journals. As announced in the conference web site* authors of the respective papers "are responsible of the **content** of their respective papers, as well as for their respective **proofreading and copyediting."**

This information is detailed and totalized in the following table, along with the other collocated event:

Conference	# of submissions received	# of reviewers that made at least one review	# of reviews made	Average of reviews per reviewer	Average of reviews per submission	# of papers included in the proceedings	% of submissions included in the proceedings
IMCIC 2023	60	171	283	1.65	4.72	41	68.33 %
ICSIT 2023	44	149	260	1.74	5.91	21	47.73 %
CICIC 2023	69	210	498	2.37	7.22	46	66.67 %
TOTAL 2023	**173**	**530**	**1041**	**1.96**	**6.02**	**108**	**62.43 %**

We also extend our gratitude to the co-editors of these proceedings, for the hard work, energy and eagerness they displayed in their respective activities. We express our intense gratitude to the late Professor William Lesso for his wise and opportune tutoring, for his eternal energy, integrity, and continuous support and advice, as the Program Committee Chair of past conferences, organized by the International Institute of Informatics and Systemics, as well as for being a very caring old friend and intellectual father to many of us.

Special thanks to Professors José Ferrer and Michael Savoie for co-chairing IMCIC 2023 Program Committee, to Professor Hsing-Wei Chu for his General Co-chairmanship, and to Belkis Sánchez for chairing its Organizing Committee. Special thanks also to Professor Friedrich Welsch for chairing ICETI 2023, Professors José Ferrer and Belkis Sánchez for co-chairing its Organizing Committee, and to Professor Andrés Tremante for serving as General Co-chair.

We also extend our gratitude to the following scholars, researchers, and professionals who (up to the moment in which this Foreword is being written) accepted to deliver plenary Workshop and Tutorial, support the conference as panelists in conversational panels, chair conversational sessions and/or to address the audience of the General Joint Plenary Sessions with keynote addresses (More details, abstracts and short bios, were included in the Conference Program booklet and at: http://www.iiis.org/spring2023plenaryevents)

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- **Dr. Risa Blair**, Purdue University Global, USA.
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- **Gerard Ward**, PhD Candidate at The University of Auckland, New Zealand.

We also would like to extend our appreciation and express our thankfulness and gratitude to the following invited session organizers, for their time and for getting in charge of the reviewing processes of their respective invited sessions.

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- **Dr. Elena Fabiola Ruiz Ledesma**, Instituto Politécnico Nacional, México.
- **Professor Trung Tran**, Vietnam Academy for Ethnic Minorities, Vietnam.

We also wish to thank all the authors for the quality of their papers, and to the 530 reviewers (who reviewed at least one article of IMCIC/ICSIT/CICIC 2023 and its collocated events) for the great job they did, making the 1041 reviews that supported the acceptance process. We also extend our gratitude to all the members of the secretariat and the staff for their knowledgeable effort in supporting the organizational process, the help desk, and the production of the proceedings.

Professor Nagib C. Callaos
ICSIT 2023 General Chair

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