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## **PROCEEDINGS**

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The 17<sup>th</sup> International Conference on Education and Information Systems, Technologies and Applications: EISTA 2019  
in the context of  
The 13<sup>th</sup> International Multi-Conference on Society, Cybernetics and Informatics: IMSCI 2019



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### **Number of Papers Included in these Proceedings per Country**

(The country of the first author was the one taken into account for these statistics)

<b>Country</b>	<b># Papers</b>	<b>%</b>
<b>TOTAL</b>	<b>43</b>	<b>100.00</b>
United States	8	18.59
Russian Federation	4	9.29
UK	4	9.29
Brazil	3	6.98
South Africa	3	6.98
Colombia	2	4.64
France	2	4.64
Italy	2	4.64
Peru	1	2.33
Germany	1	2.33
Mexico	1	2.33
Taiwan	1	2.33
Canada	1	2.33
South Korea	1	2.33
China	1	2.33
Costa Rica	1	2.33
Czech Republic	1	2.33
United Arab Emirates	1	2.33
Bulgaria	1	2.33
Greece	1	2.33
Lebanon	1	2.33
Lithuania	1	2.33
Romania	1	2.33

## Foreword

Informatics and Cybernetics (communication and control) are increasingly increasing their impact on societies and on the globalization process that is relating them. Societies and cultures are trying to regulate this impact, and adapt it to their respective sociocultural infrastructures, and, consequently, generating reciprocal co-adaptations with Information and Communication Technologies. Synergic relationships might emerge in this co-adaptation process by means of positive and negative feedback loops, as well as with feed-forward ones. This would make the whole larger than the sum of its parts, generating emergent properties of the parts involved as well as in the whole coming forth. The academic, private, and public sectors are integrating their activities; multi-disciplinary groups and inter-disciplinary teams are being formed, and collaborative research and development projects are being organized in order to facilitate and adequately orient the design and implementation of the feedback and the feed-forward loops, and potentially generating synergistic relationships. This phenomenon persuaded the Organizing Committee to organize The 13<sup>th</sup> International Multi-Conference on Society, Cybernetics and Informatics (IMSCI 2019) in a multi-disciplinary context along with other collocated events. Consequently, participants may focus on one discipline, while allowing them the possibility of attending conferences from other disciplines. This systemic approach stimulates cross-fertilization among different disciplines, inspiring scholars, originating new hypothesis, supporting production of innovations and generating analogical thinking.

IMSCI 2019 was organized and sponsored by the International Institute of Informatics and Systemics (IIIS, [www.iiis.org](http://www.iiis.org)), member of the International Federation of Systems Research (IFSR). 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 trans-disciplinarity 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 1 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 hypotheses. An extended presentation regarding this issue can be found at [www.iiis.org/MainPurpose](http://www.iiis.org/MainPurpose).

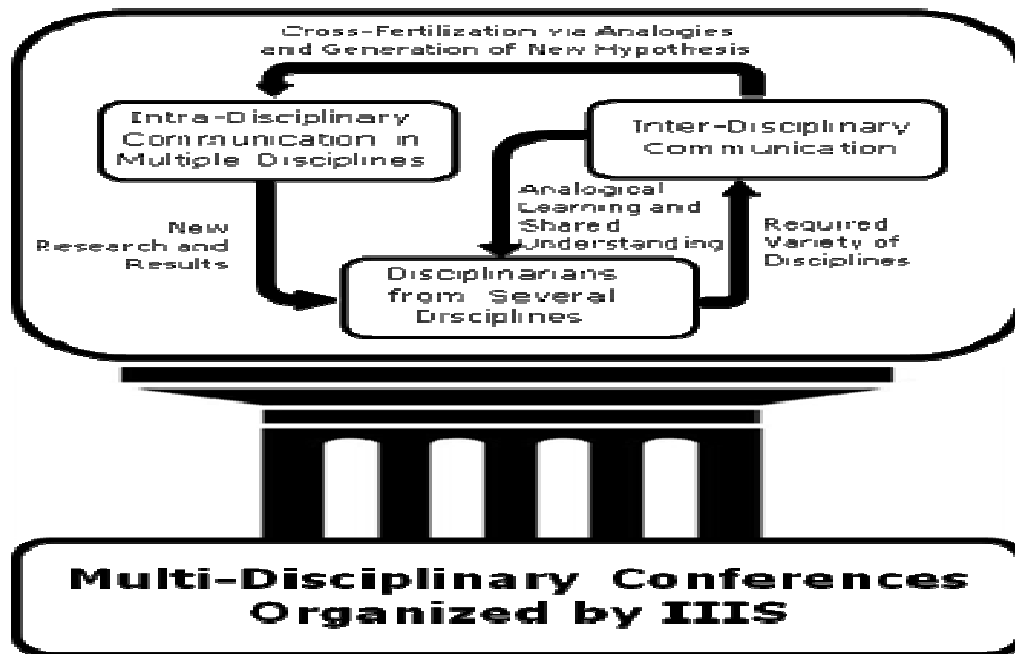


Figure 1

One of the main purposes of IMSCI 2019 is to bring together academics, professionals, and managers from the private and the public sectors, in order to share ideas, results of research, and innovative services or products, in a multi-disciplinary and multi-sector forum. Educational technologies, socioeconomic organizations, and sociopolitical 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. Consequently, the main conference in the context of the IMSCI 2019 Multi-Conference is the 17<sup>th</sup> International Conference on Education and Information Systems, Technologies and Applications: EISTA 2019. The relationship between education/training and Information and Communication Technologies (ICT) is quickly intensifying and sometimes appears in unexpected forms and in combination with original ideas, innovative tools, methodologies, and synergies. Accordingly, the primary purpose of EISTA 2019 has been to bring together researchers and practitioners from both areas together to support the emerging bridge between education/training and the ICT communities.

In the context of EISTA 2019, practitioners and consultants were invited to present case studies and innovative solutions. Corporations were invited to present education/training information systems and software-based solutions. Teachers and professors were invited to present case studies, specifically developed information systems, and innovative ideas and designs. Educational scientists and technologists were invited to present research or position



papers on the impact and the future possibilities of ICT in educational systems, training processes, and methodologies. Managers of educational organizations and training consultants were invited to present problems that might be solved with ICT or solutions that might be improved by different approaches and designs in ICT.

EISTA 2019 provides a forum for the presentation of solutions and problems in the application of ICT in the fields of education/training. Authors of the papers included in the proceedings provided diverse answers to the following questions:

- What is the impact of ICT in education and training?
- How ICTs are affecting and improving education and training? What networks and models are emerging?
- How are universities, schools, corporations and other educational/training organizations making use of ICT?
- What electronic tools are there to facilitate e-learning, distance education and co-operative training?

On behalf of the Organizing Committees, I extend our heartfelt thanks to:

1. The 112 members of the Program Committees from 35 countries (including the events and the special tracks organized in the context of IMSCI 2019)
2. The 318 additional reviewers, from 59 countries, for their ***double-blind peer reviews***; and
3. The 123 reviewers, from 37 countries, for their efforts in making the **non-blind peer reviews**. (Some reviewers supported both: non-blind and double-blind reviewing for different

A total of 977 reviews made by 441 reviewers (who made at least one review), from 66 countries, contributed to the quality achieved in IMSCI 2019. This means an average of 11.10 reviews per submission (88 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 also 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 IMSCI 2019, about 88 articles were submitted. These pre-conference proceedings include about 43 papers, from 23 countries that were accepted for presentation (43 countries taking into account the presentations in collocated events). We extend our thanks to co-chairs special track organizers for their support. 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.

This information about IMSCI 2019 is summarized in the following table, along with the other collocated conferences:

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
WMSCI 2019	181	984	1542	1.57	8.52	101	55.80
IMSCI 2019	88	441	977	2.22	11.10	43	48.86
WMSCI & IMSCI	269	1425	2519	1.77	9.36	144	53.53
CISCI 2019	118	572	1206	2.11	10.22	74	62.71
TOTAL	387	1997	3725	1.87	9.63	218	56.33

All submissions were peer reviewed by the two-tier reviewing methodology of the International Institute of Informatics and Systemics (IIS, [www.iis.org](http://www.iis.org)). As it might be noticed, from the table above, ***11.10 reviews were made, in average, for each submission we received.*** After the conference is over, the names of the reviewers will be published on the IIS web site along with the titles of the papers each reviewer reviewed. This means that what had been a double-blind review, up to the conference, is transformed to single-blind review, after the conference is over. In this way, each author would have information about the names of the reviewers of his/her submission, but not vice-versa. Likewise, each author would know how many reviewers reviewed his/her submission and relate it to the average, being informed in the above table, of 11.10 reviews per paper.

Our two-tier reviewing methodology meet two different objectives of peer-review: 1) to improve the paper via non-anonymous reviewers (non-blind reviews) and 2) to improve the acceptance/non-acceptance decision of the Organizing Committee via traditional anonymous reviewers (double-blind reviews) A recommendation to accept, made by non-anonymous reviews, is a ***necessary*** condition, but it is ***not a sufficient*** one. A submission, to be accepted, should also have a majority of its double-blind reviewers recommending its acceptance. These two necessary conditions generate a more reliable and rigorous reviewing than any of those reviewing methods, based on just one of the indicated methods, or just on the traditional double-blind reviewing.

We extend our gratitude to the co-editors of these proceedings for the hard work, energy and eagerness they have shown in organizing their conferences and preparing their respective sessions. We express our intense gratitude to Professor William Lesso (1931-2015) for his wise, timely, adequate and valuable tutoring, as well as for his eternal energy, integrity, and continuous support and advice, as the Program Committee Chair of past conferences, and as Honorary President of WMSCI 2019, as well as for being a very caring old friend and intellectual father to many of us. We also extend our gratitude to Professor Belkis Sánchez, who brilliantly managed the organizing process.

We would like also to extend our gratefulness to Professor Shigehiro Hashimoto for his yearly support in the last 20 years as well as for his editorial work for the journal; as well as to Professor Grandon Gill, Dr. Jeremy Horne, Professor Thomas Marlowe and Professor Matthew E. Edwards for their continuous advice and support in the conferences they participated in, along the last 12 years; as well as in the conferences they were not able to

participate in. Their advices and the kind of care they provided us with are highly valued and appreciated.

We also extend our gratitude to the following scholars, researchers, and professionals who accepted to deliver plenary workshops and/or to address the audience of the General Joint Plenary Sessions with keynote addresses.

### **Workshops and Conversational Sessions**

**Professor Thomas Marlowe**, Seton Hall University, USA, Department of Mathematics and Computer Science, Program Advisor for Computer Science, Doctor in Computer Science and, Doctor in Mathematics.

**Professor Stuart A. Umpleby**, The George Washington University, USA, President of the Executive Committee of the International Academy for Systems and Cybernetics Sciences, Former President of The American Society of Cybernetics.

**Professor Matthew E. Edwards**, Alabama A&M University. USA, Professor of Physics and, Former Dean, School of Arts and Sciences, Director of IHSEAR: Institute of Higher Science Education Advancement, and Research.

**Professor Tatiana Medvedeva**, Siberian State University of Transport. Russia, Department of World Economy and Law Former Head of the Scientific and Practical Center for Business and Management.

**Dr. Bruce E. Peoples**, Innovations LLC, USA, Founder and CEO, Formerly at Université Paris 8, France, Laboratoire Paragraphe, Chair Emeritus of an ISO/IEC Standards Committee, Generated over 50 Invention Disclosures, 15 Patent Applications and 11 Patent Awards.

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**Professor Richard Self**, University of Derby, UK, The School of Computing and Mathematics, Senior Lecturer in Analytics and Governance.

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**Professor Dr. oec Natalja Lace**, Riga Technical University, Faculty of Engineering, Economy and Management. Head of Department of Corporate Finance and Economics.

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Our gratefulness is also extended to the organizations that provided scientific, academic, professional, or corporate co-sponsorships. The following are among these organizations:



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Dr. Nagib Callaos  
*IMSCI 2019 General Chair*  
[www.iiis.org/Nagib-Callaos](http://www.iiis.org/Nagib-Callaos)

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