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**Special Track on Knowledge and Cognitive Science and Technologies: KCST 2016**  
**In the context of**  
**The 20th World Multi-Conference on Systemics, Cybernetics and Informatics: WMSCI 2016**



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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>108</b>	<b>100.00</b>
United States	23	21.30
Japan	16	14.81
Czech Republic	8	7.41
Russian Federation	7	6.48
Germany	6	5.56
Slovakia	6	5.56
Taiwan	5	4.63
South Korea	4	3.70
China	3	2.78
India	3	2.78
Italy	3	2.78
Latvia	3	2.78
South Africa	3	2.78
Brazil	2	1.85
Paraguay	2	1.85
Spain	2	1.85
Argentina	1	0.93
Austria	1	0.93
Ecuador	1	0.93
Iraq	1	0.93
Kuwait	1	0.93
Mexico	1	0.93
Nicaragua	1	0.93
Pakistan	1	0.93
Poland	1	0.93
Saudi Arabia	1	0.93
Switzerland	1	0.93
Turkey	1	0.93





## Foreword

Our purpose in the 20<sup>th</sup> World Multi-Conference on Systemics, Cybernetics and Informatics (WMSCI 2016) 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.

Systemics, Cybernetics and Informatics (SCI) are being increasingly related to each other in almost every scientific discipline 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 WMSCI 2016 as a multi-conference where participants may focus on one area, or on one discipline, while allowing them the possibility of attending conferences 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.

WMSCI 2016 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 4500 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, along with its essential characteristic of emphasizing *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 hypothesis. An extended presentation regarding this issue can be found at [www.iiis.org/MainPupose](http://www.iiis.org/MainPupose).

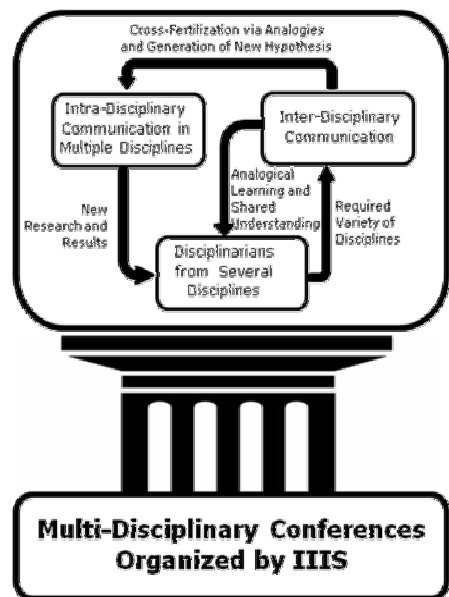


Figure 1

In the specific case of Systemics, Cybernetics and Informatics (SCI), the IIIS is an organization dedicated to contribute to the development of the Systems Approach, Cybernetics, and Informatics potential, using both: knowledge and experience, thinking and action, theory and practice, for:

- a) the identification of synergetic relationships among Systemics, Cybernetics and Informatics, and between them and society;
- b) the promotion of contacts among the different academic areas, through the transdisciplinarity of the systems approach;
- c) the identification and implementation of communication channels among the different professions;
- d) the 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) the stimulus for the creation of integrative arrangements at different levels of society, as well as at the family and personal levels,
- f) the promotion of transdisciplinary research, both on theoretical issues and on applications to concrete problems.

These IIIS objectives have oriented the organizational efforts of yearly WMSCI/ISAS conferences since 1995.

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

1. The 688 members of the Program Committee from 61 countries (including the PC members of the events organized in its context and jointly with it). Almost all the members of the Program Committee are *authors or co-authors sessions' best papers*, i.e. papers selected by the respective audience as the best paper of the session in which they were presented;
2. The 520 additional reviewers, from 74 countries, for their *double-blind peer reviews*; and
3. The 221 reviewers, from 54 countries, for their efforts in making the *non-blind peer reviews*. (Some reviewers supported both: non-blind and double-blind reviewing for different submissions).

A total of 1173 reviews made by 741 reviewers (who made at least one review) contributed to the quality achieved in WMSCI 2016. This means an average of 5.48 reviews per submission (214 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 WMSCI 2016, about 214 articles were submitted. These pre-conference proceedings include about 96 papers that were accepted for presentation from 28 countries (43 countries taking into account the presentations in collocated events). I extend our thanks to the invited sessions' organizers for collecting, reviewing, and selecting the papers that will be presented in their respective sessions. 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 WMSCI 2016 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 2016	214	741	1173	1.58	5.48	108	50.47%
IMSCI 2016	147	358	692	1.93	4.71	62	42.18%
CISCI 2016	133	510	1120	2.20	8.42	62	46.62%
<b>TOTAL</b>	<b>494</b>	<b>1609</b>	<b>2985</b>	<b>1.86</b>	<b>6.04</b>	<b>232</b>	<b>46.96%</b>

We also extend our gratitude to the invited sessions' organizers: Dr. Shigehiro Hashimoto, and Dr. Natalja Lace, as well as the special track co-chairs and the co-editors of these proceedings, for the hard work, energy and eagerness they displayed preparing their respective sessions. We express our intense gratitude to Professor William Lesso (1931-2015) for his wise and opportune tutoring, for his eternal energy, integrity, and continuous support and advice, as the Program Committee Chair of past conferences, 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.

Our gratitude to Professors Bela H. Banathy, Stafford Beer, George Klir, Karl Pribram, Paul A. Jensen, and Gheorghe Benga who dignified our past WMSCI conferences by being their Honorary Presidents. Special thanks to Dr. C. Dale Zinn and Professor Jorge Baralt for co-chairing WMSCI 2016 Program Committee and to professors Andrés Tremante and Belkis Sánchez for co-chairing the Organizing Committee. 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.

**Plenary Workshops**, more details (abstracts and short bios) were included in the Conference Program booklet and at <http://www.iiis.org/summer2016plenaryevents/>

**Professor Emeritus Stuart Umpleby**, The George Washington University, USA, Former President of The American Society of Cybernetics.

**Tom Hull**, MS. CIO Florida Polytechnic University, USA, Vice President and Chief Information Officer, CTO of Moffitt Cancer Center, Former VP and CIO - Pace University; VP and CIO - Siena College, IBM Director and Executive Consultant.

**Plenary Keynote Speakers**, more details more details (abstracts and short bios) were included in the Conference Program booklet and at <http://www.iiis.org/summer2016plenaryevents/>

**Professor J. Hanns Pichler**, University of Economics & Business Administration, Vienna, Austria, Senior Schumpeter Fellow, Center for European Studies/Harvard University.

**Professor Shigehiro Hashimoto**, Kogakuin University, Japan, Associate to the President and Dean of Admissions Center, Doctor of Engineering and Doctor of Medicine, Professor and Researcher on Biomedical Engineering.

**Professor Stuart A. Umpleby**, The George Washington University, USA, Director of the Research Program in Social and Organizational Learning, Former President of The American Society of Cybernetics.

**Professor J. Eric Dietz**, Purdue University, USA, Computer and Information Technology Department, Director of Purdue Homeland Security Institute.

**Anne Connell**, MS, CFA, Carnegie Mellon University, USA, Software Engineering Institute – CERT, Cybersecurity Engineer, Forensics, Incident Response, Assessment and Risk Management.

**Dr. Karl H. Müller**, Director of The Steinbeis Transfer Center, New Cybernetics, Vienna, Austria, Professor at the University of Ljubljana, Slovenia.

**Professor Hans Mulder**, University of Antwerp, Belgium, Executive Professor at the Antwerp Management School European Research Director at the Standish Group.

**Jim Johnson**, The Standish Group, USA, Founder and Chairman, 40 Years of Experience in the Computer Industry, Mission-Critical Applications and Technology.

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**Eng. Joseph Prezzama**, MITRE Corporation, USA, Associate Department Head, Tampa Operations

**David Shearer**, CISSP, The International Information, Systems Security Certification Consortium (ISC)<sup>2</sup>, USA, Chief Executive Officer, Deputy Chief Information Officer at the U.S. Department of the Interior

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

**Dr. Doug Sparkes**, University of Waterloo, Canada, Conrad Business Entrepreneurship and Technology Centre, Associate Director, Undergraduate Programs.

**Professor Bettina Harriehausen-Mühlbauer**, University of Applied Sciences, Germany Computer Science Department, A.I., Natural Language Processing, and Mobile Applications.

**Professor Tomas Zelinka**, Czech Technical University in Prague, Czech Republic, Faculty of Transportation Sciences, Vice-Dean, Among his present research interests: Smart Cities & villages.

**Dr. Mario Lamanna**, Evoelectronics, Italy and Selex-SI, USA, Senior Scientist.

**Dr. Jeremy Horne**, President-emeritus, Southwest Area Division, American Association for the Advancement of Science (AAAS), USA.

**Dr. Russell Jay Hendel**, Towson University, USA, Dept of Mathematics.

**Professor Richard Segall**, Arkansas State University, USA, Computer Information Technology.

**Dr. Marta Szabo White**, Georgia State University, USA, Director of the Study Abroad in Transition Economies, Director of Business Learning Community, Director of the Program Business Mediterranean Style.

**Dr. Denise K. Comer**, Duke University, USA, Director of First-Year Writing in the Thompson Writing Program, Founding director of the Duke-Ronald McDonald House of Durham Family Story Project.

**Professor Majid Al-Haj**, University of Haifa, Israel, Head of the Center for Multiculturalism and Educational Research, Former Vice President and Dean of Research at the University of Haifa.

**Professor Ronald A. Styron, Jr.**, University of South Alabama, USA, Director of the Quality Enhancement Plan, Professor of Educational Leadership.

**Dr. Jennifer Styron**, University of South Alabama, USA, College of Nursing Former Research Specialist and Distance Education Coordinator at The University of Southern Mississippi, USA.

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**Professor Sushil Acharya**, Robert Morris University, USA, Director of Research & Grants, School of Engineering, Mathematics and Science, Software Engineering.

**Dr. Joe Manganelli**, Kent State University, USA, Fluor Corporation, xplr design, llc.

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We also extend our gratitude to the following scholars, researchers, and professionals who accepted to deliver keynote addresses at the sub-plenary session of the The 15<sup>th</sup> Ibero-American Conference on Systems, Cybernetics and Informatics: CISCi 2016 (*Décima Quinta Conferencia Iberoamericana en Sistemas, Cibernética e Informática: CISCi 2016*) collocated with WMSCI 2016 and IMSCI 2016

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