The International Academy for Systems and Cybernetic Sciences

http://iascys.org

IASCYS

Emergence, Self-Organization,
Non-Linear Dynamics, Complexity,
Innovation, Complex Engineered Systems,
Complex Societal Systems, Complex Biological and Ecological Systems,
Complex Networks of Networks, Complex Systems Management

Research, Development and Education in Systems Science and Cybernetics: paradigms, models and applications

The Academy of Mathematics and System sciences,

Zhonguancun East Road, Haidi District, **Beijing, P. R. China**

2019, May 10-12

IASCYS
The International Academy for Systems & CYbernetic Sciences

66 Academicians (2019/05/03)
-alphabetic order-

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7. Xiaoqiang **CAI** (PR China) Systems Engineering and Engineering Management
8. Jinde **CAO** (PR China) Artificial Intelligence
9. Antonio **CASELLES MONCHO** (Spain) Applied Mathematician
10. Guangya **CHEN** (PR China) Operations Research & Systems Engineering
11. Hanfu **CHEN** (PR China) Automation & Systems Control Engineering
12. Jian **CHEN** (PR China) Systems Engineering & Management Science
13. C.L. Philip **CHEN** (PR China) Intelligent Systems Engineering
14. T.C. Edwin **CHENG** (PR China) Business Administration
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32. Klaus **KRIPPENDORFF** (USA) Communication & Information
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34. Ervin **LASZLO** (Italy) System's Philosopher
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36. Loet **LEYDESDORFF** (Netherlands) Scientometrics and Informetrics
37. Michael **LISSACK** (USA) Complex Systems Management
38. Humberto **MATURANA** (Chile) Neuroscience & Second Order Cybernetics
39. Roberto **MORENO-DIAZ** (Spain) Computing Sciences and Artificial Intelligence
40. Edgar **MORIN** (France) Philosopher & Sociologist

41. Matjaz **MULEJ** (Slovenia) Systems Science & Innovation Theory, **Vice-President** *mulej@uni-mb.si*
42. Karl H. **MÜLLER** (Austria) Second-order Systems Science & Radical Constructivism
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44. Nebojsa **NAKICENOVIC** (Montenegro) Systems Sustainable Development
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61. Jennifer **WILBY** (UK) Management Systems
62. Stephen **WOLFRAM** (USA) Science, Technology & Business Computing
63. Jiuping **XU** (PR China) Systems Engineering, Management Science & Engineering
64. Xinmin **YANG** (PR China) Systems Engineering & Decision Making, Governance
65. Ji-Feng **ZHANG** (PR China) Mathematics and Systems Science
66. Rainer E. **ZIMMERMANN** (Germany) Philosopher

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JOAFE	13/08/2016,	http://www.associations.gouv.fr
	http://iascys.org	
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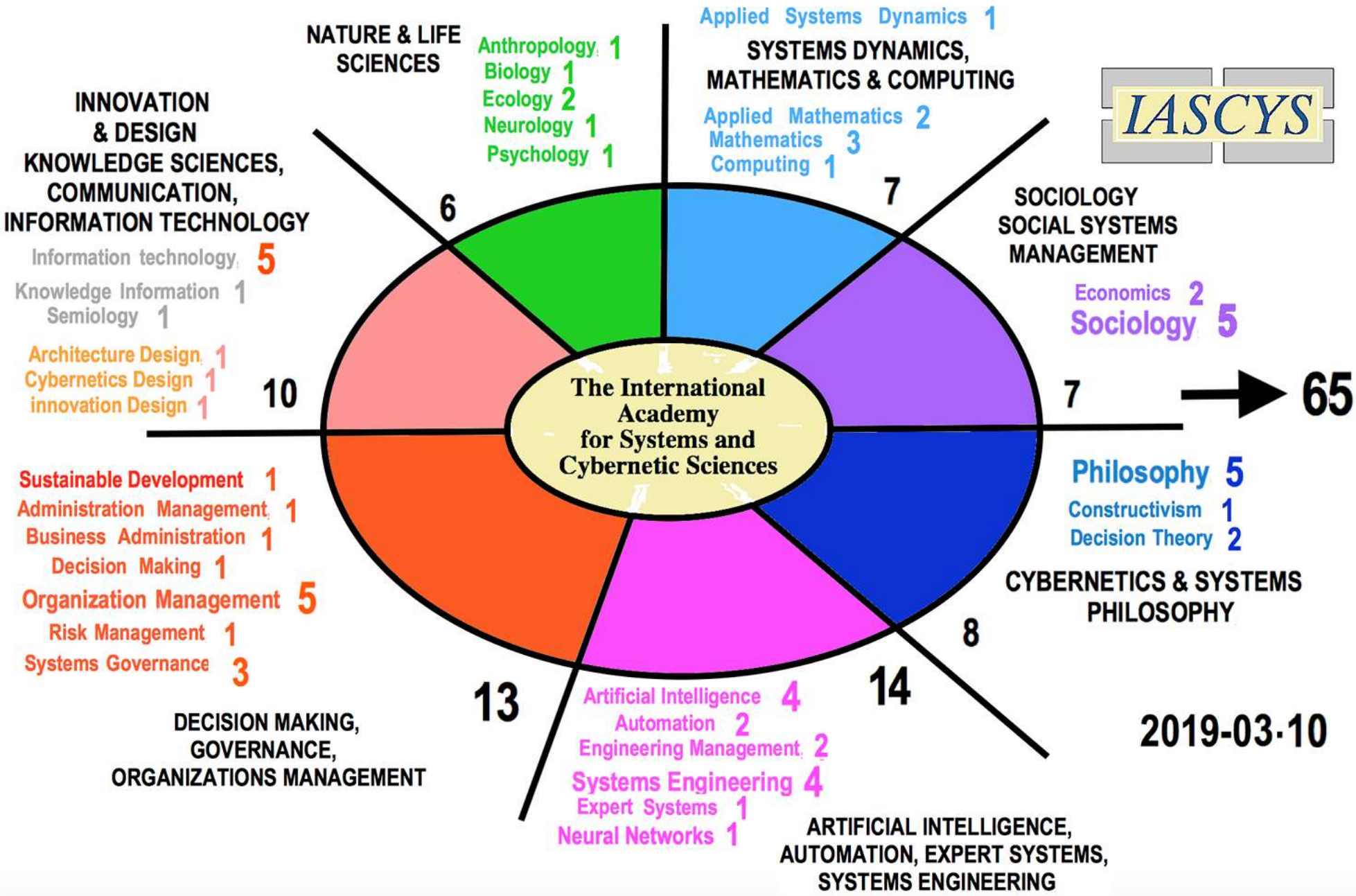
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IASCYS
NATURE & LIFE SCIENCES
Anthropology 1
Biology 1
Ecology 2
Neurology 1
Psychology 1
6
Applied Systems Dynamics 1
SYSTEMS DYNAMICS, MATHEMATICS & COMPUTING
Applied Mathematics 2
Mathematics 3
Computing 1
7
SOCIOLOGY SOCIAL SYSTEMS MANAGEMENT
Economics 2
Sociology 5
7
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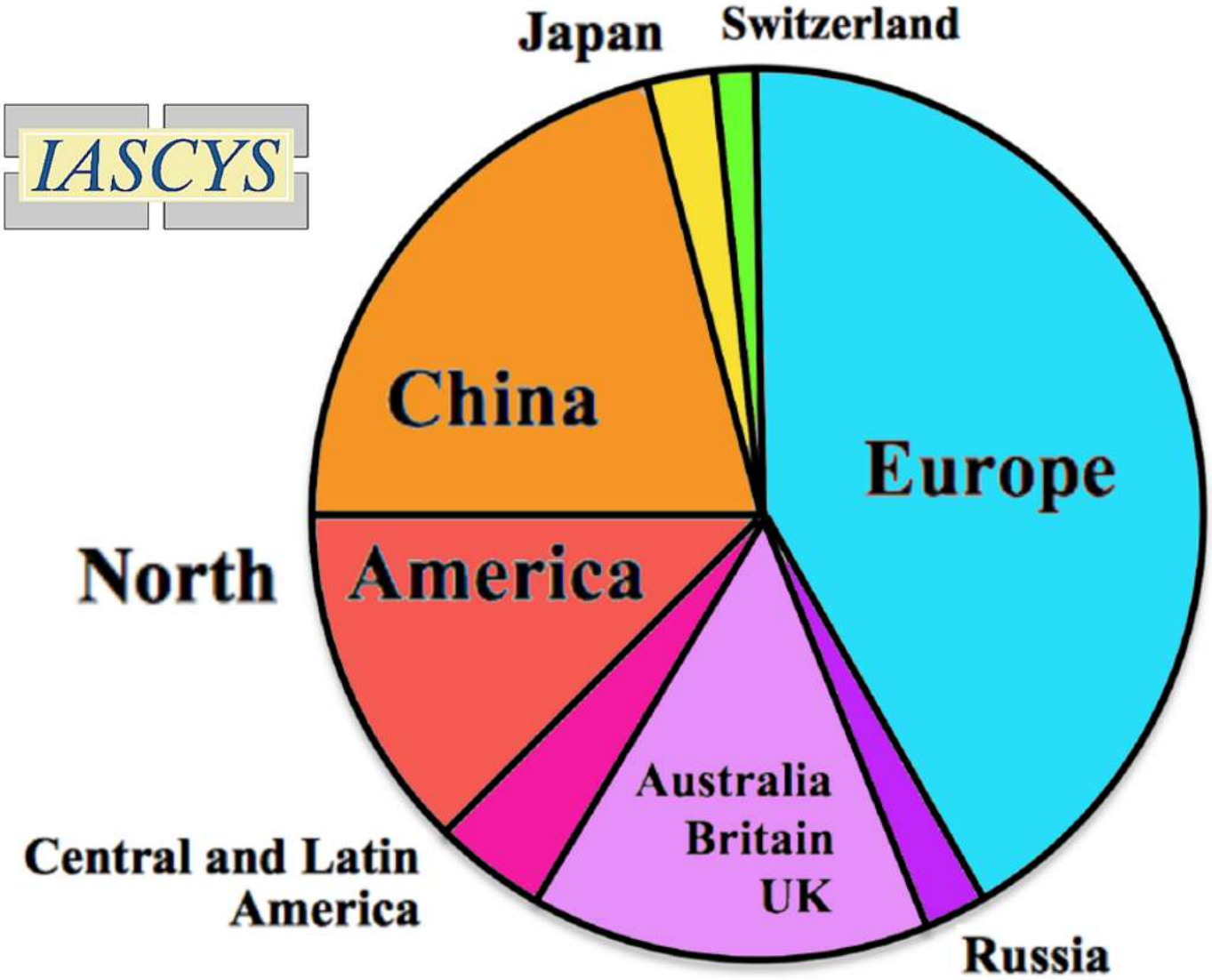
INNOVATION & DESIGN KNOWLEDGE SCIENCES, COMMUNICATION, INFORMATION TECHNOLOGY
Information technology 5
Knowledge Information 1
Semiology 1
Architecture Design 1
Cybernetics Design 1
innovation Design 1
10
Sustainable Development 1
Administration Management 1
Business Administration 1
Decision Making 1
Organization Management 5
Risk Management 1
Systems Governance 3
DECISION MAKING, GOVERNANCE, ORGANIZATIONS MANAGEMENT
13
Artificial Intelligence 4
Automation 2
Engineering Management 2
Systems Engineering 4
Expert Systems 1
Neural Networks 1
14
ARTIFICIAL INTELLIGENCE, AUTOMATION, EXPERT SYSTEMS, SYSTEMS ENGINEERING
8
Philosophy 5
Constructivism 1
Decision Theory 2
CYBERNETICS & SYSTEMS PHILOSOPHY
2019-03-10

1 member from Americas		
Argentina	1	
Canada	1	
Chile	1	
USA	8	11
1 member from Australia and the UK		
Australia	2	
Britain	3	
UK	3	8
1 member from China and Japan		
China	13	
Japan	2	15
2 members from Europe and Russia		
Austria	5	
Belgium	1	
Denmark	1	
France	5	
Germany	1	
Hungary	1	
Ireland	1	
Italia	1	
Macedonia	1	
Montenegro	1	
Netherlands	2	
Poland	1	
Romania	1	
Slovenia	1	
Spain	4	
Sweden	1	30
Russia	2	
Switzerland	1	
	27	65



14 November 2018

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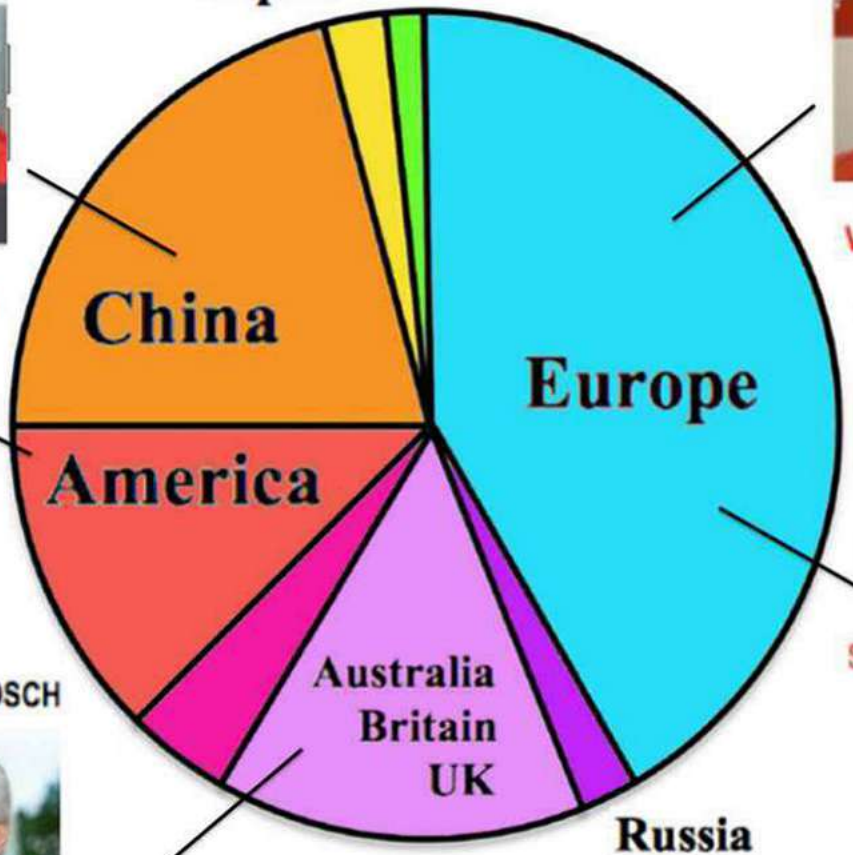


59 alive Academicians, **majority is 30/59**

39 votes (66%)

33 YES (majority is 30), 2 NO, 3 ABSTAIN, 1 BLANK

Systems Thinking for EVERYONE

Course presented by Professor Ockie Bosch, Academician and Vice-President of the International Academy for Systems and Cybernetic Sciences - IASCYS

IASCYS malik SysPrac SDM System Design And Management

Why this Course?

Today's complex problems and challenges can no longer be tackled with the narrowly-focused, unconnected thinking of the past. Leaders and managers must make important decisions in complex environments in which finance, economics, people and nature are all highly interconnected. To make things even more challenging, complex problems also transcend the jurisdictions and capacities of different organisations, government departments or companies.

The challenges are great, but before you decide that it has become too difficult to be a new era leader or manager, all it requires is to open yourself to "new ways of thinking, interconnected thinking and acting" that will help our society's future to

Avoid continuing to work in silos, tackling problems with a narrow focus, and using linear thinking (not interconnected) that leads to quick fixes and firefighting that address the symptoms rather than root causes; and

Ensure informed, adaptive decision making becomes important to make people aware of systemic relations and consequences of their decisions/actions.

What Do I Learn in the Course?

Understand that issues facing the world are complex and multi-dimensional, straddle many different factors and involve diverse multi-stakeholder systems;

Understand the context in which the problems arise (culture, political systems, economic conditions, values) and how disciplines or areas of interest fit into the whole;

Understand concepts of interconnectedness and interdependence and causality understand variety in mental models

Create a mindset for how the changing nature of the world impacts upon the way in which people and organisations make decisions;

Learn to deliver projects on-time and within budget

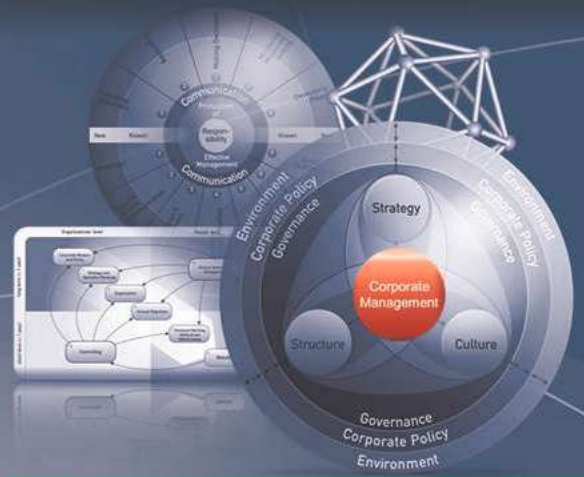
Learn how to use systems tools to diagnose and analyse complex systems - e.g. to identify key leverage points for systemic interventions

Develop new skills to address the underlying root causes rather than the symptoms of a problem;

Learn to manage complex problems in any/various areas and contexts

CONTACT PROF OCKIE BOSCH MOB +61 417076122 EMAIL: OCKIE.BOSCH@MZSG.CH

Who should be attending this unique Learning Experience? **EVERYONE** regardless of your background; top and middle **managers**; **students** in all fields of study; **decision makers and takers**



A NEW WAY OF THINKING

Short Course

Presented by: PROFESSOR DR OCKIE BOSCH, Vice-President, IASCYS

Systems Thinking for EVERYONE

malik

SDM System Design And Management

SysPrac

Why this Course?

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The challenges are great, but before you decide that it has become too difficult to be a new era leader or manager, all it requires is to open yourself to **"new ways of thinking, interconnected thinking and acting"** that will help our society's future to

- Avoid continuing to work in silos, tackling problems with a narrow focus, and using linear thinking (not interconnected) that leads to quick fixes and firefighting that address the symptoms rather than root causes; and
- Ensure informed, adaptive decision making becomes important to make people aware of systemic relations and consequences of their decisions/actions.

What Do I Learn in the Course?

- Understand that issues facing the world are complex and multi-dimensional, straddle many different factors and involve diverse multi-stakeholder systems;
- Understand the context in which the problems arise (culture, political systems, economic conditions, values) and how disciplines or areas of interest fit into the whole;
- Understand concepts of interconnectedness and interdependence and causality understand variety in mental models
- Create a mindset for how the changing nature of the world impacts upon the way in which people and organisations make decisions;
- Learn to deliver projects on-time and within budget
- Learn how to use systems tools to diagnose and analyse complex systems - e.g. to identify key leverage points for systemic interventions
- Develop new skills to address the underlying root causes rather than the symptoms of a problem;
- Learn to manage complex problems in any/various areas and contexts

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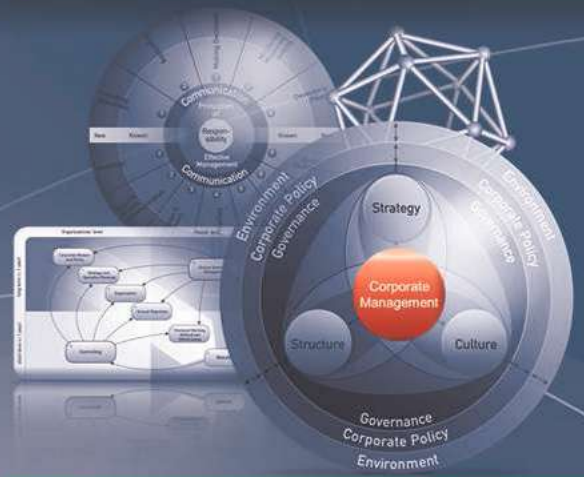

A NEW WAY OF THINKING

THE MISSION OF THE INTERNATIONAL ACADEMY FOR SYSTEMS AND CYBERNETIC SCIENCES: SOME RECENT DISCOVERIES

Stuart Umpleby
President of the IASCYS Executive Committee

The International Academy for Systems and Cybernetic Sciences was created as an honor society for people who have made outstanding contributions to the fields of systems science or cybernetics. In addition to choosing people to be academicians, the members of the Academy work to aid the growth and development of these fields. Through conferences and publications we seek to learn what the various societies in the field are doing – what questions they are asking and what themes they are pursuing. We then share our discoveries with colleagues in associations in many countries.

Probably more than scholars in traditional fields, people in systems and cybernetics work on three levels – practice, theory and philosophy. Work at each level is used to test, extend and enrich knowledge on other levels. In our discussions at conferences and through the exchange of papers we have learned that scientists in this field have identified three stages in the development of the field. At the level of observed systems, we work to improve engineered systems, management systems and human communication. At the level of cognition we develop analytic methods and simulation techniques and seek to understand the process of cognition and communication. At the level of social systems we search for reliable knowledge and invent and test institutions and procedures to aid innovation, coordination and consensus-building. However, we have found that these stages are described differently in China, Russia and the US and Europe taken together. So, we are now seeking to learn new theories and methods from each other.

We have found that Americans evaluate theories through their practical utility while Europeans organize knowledge according to the history of philosophy. Combining these two approaches has significant advantages. Americans have tested theories of knowledge through neurophysiological experiments. This work has led to ideas about how to expand the conception of science in accord with basic principles from the philosophy of science. The Chinese have had a strong interest in systems engineering due to the large number of construction projects currently underway in China. They have developed a theory and methods of systems engineering that integrate engineering and management more closely than is done in the US and Europe. Russian scientists have developed a theory of reflexive control and they are increasingly using participatory methods at the community level. There are a variety of views of complexity and reflexivity, and current discussions are comparing the various points of view.

As in the past people working in systems and cybernetics seek to learn from and integrate the knowledge in the traditional disciplines, striving for more general theories and more useful methods.

Stuart A. UMPLEBY https://en.wikipedia.org/wiki/Stuart_Umpleby

Stuart A. Umpleby is professor emeritus in the Department of Management at the George Washington University in Washington, DC. He received degrees in engineering, political science, and communications from the University of Illinois in Urbana-Champaign. Umpleby has published articles in Science, Policy Sciences, Population and Environment, Science Communication, Futures, World Futures, The Journal of Aesthetic Education, Simulation and Games, Business and Society Review, Telecommunications Policy, Journal of the Washington Academy of Sciences, Reflexive Control, Systems Practice, Kybernetes, Cybernetics and Human Knowing, Cybernetics and Systems and several foreign language journals. He is a past president of the American Society for Cybernetics. He is Associate Editor of the journal Cybernetics and Systems. Umpleby has received research grants from the National Science Foundation, the Charles F. Kettering Foundation, the Charles Stewart Mott Foundation, the Nathan Cummings Foundation, the U.S. Department of State's Bureau of Educational and Cultural Affairs and the Central Asia Research Initiative. He has consulted with the World Bank, with government agencies in the U.S. and Canada and with corporations in the U.S., Europe, Japan, and China. He has been a guest scholar at the Wharton School of the University of Pennsylvania, the International Institute for Applied Systems Analysis in Laxenburg, Austria, the University of Vienna, the Institute for Advanced Studies in Vienna and the University of St. Gallen in St. Gallen, Switzerland. In spring 2004 he was a Fulbright Scholar in the School of Economics and Business, University of Sarajevo, Sarajevo, Bosnia-Herzegovina. Between 1981 and 1988 Umpleby was the American coordinator of a series of meetings between American and Russian scientists to discuss the foundations of cybernetics and systems theory. These meetings were supported by the Russian Academy of Sciences and the American Council of Learned Societies. His interest in the transitions in the post-communist countries has resulted in his presenting lectures at various institutes of the Academies of Science of Russia, Ukraine, Poland, Hungary, and Bulgaria. He received the Norbert Wiener Award of the American Society for Cybernetics.

SOME EXAMPLES OF HOW SYSTEMS AND CYBERNETICS CAN CONTRIBUTE TO TRADITIONAL DISCIPLINES

Stuart A. UMPLEBY
President of the Executive Committee
International Academy for Systems and Cybernetic Sciences

Since they were founded in the mid-twentieth century the fields of systems science and cybernetics have worked to create more general theories for existing fields, to define theories of control and communication to complement theories of matter and energy, and to aid existing fields by using helpful knowledge from other fields. This paper will describe a few examples of how systems and cybernetics have in the past and are currently contributing ideas to traditional disciplines. The traditional disciplines taken as examples are management, the social sciences, and philosophy of science.

The field of management has benefited from Ashby's theory of adaptive behavior and his Law of Requisite Variety, which provides a quantitative relationship between information and selection. Management has also benefitted from Beer's Viable System Model, which is based on the structure of the human nervous system. Other contributions to management have been group decision-making methods such as Beer's concept of syntegrity and Ackoff's Interactive Planning.

The fields of psychology, economics, and political science have benefitted from Vladimir Lefebvre's theory of reflexive control and George Soros's theory of reflexivity. Lefebvre's theory describes two systems of ethical cognition. The theory is helpful in making a transition from confrontation and conflict to the rule of law. George Soros's theory of reflexivity explicitly includes the decisions and actions of observers. It places the social scientist inside the system observed and makes clear the difficulty of forecasting in social systems since they include thinking participants.

The philosophy of science has had, at least since Plato and Aristotle, more than one epistemology. Warren McCulloch suggested resolving different views of epistemology by investigating how the brain works. The strategy was to study cognition by conducting neurophysiological experiments. These ideas are embodied in the literature on second order cybernetics, which has taken up the challenge of criticing the development of science, an interest earlier practiced by the philosophy of science.

Stuart A. UMPLEBY https://en.wikipedia.org/wiki/Stuart_Umpleby
Stuart A. Umpleby is professor emeritus in the Department of Management at the George Washington University in Washington, DC. He received degrees in engineering, political science, and communications from the University of Illinois in Urbana-Champaign. Umpleby has published articles in Science, Policy Sciences, Population and Environment, Science Communication, Futures, World Futures, The Journal of Aesthetic Education, Simulation and Games, Business and Society Review, Telecommunications Policy, Journal of the Washington Academy of Sciences, Reflexive Control, Systems Practice, Kybernetes, Cybernetics and Human Knowing, Cybernetics and Systems and several foreign language journals. He is a past president of the American Society for Cybernetics. He is Associate Editor of the journal Cybernetics and Systems. Umpleby has received research grants from the National Science Foundation, the Charles F. Kettering Foundation, the Charles Stewart Mott Foundation, the Nathan Cummings Foundation, the U.S. Department of State's Bureau of Educational and Cultural Affairs and the Central Asia Research Initiative. He has consulted with the World Bank, with government agencies in the U.S. and Canada and with corporations in the U.S., Europe, Japan, and China. He has been a guest scholar at the Wharton School of the University of Pennsylvania, the International Institute for Applied Systems Analysis in Laxenburg, Austria, the University of Vienna, the Institute for Advanced Studies in Vienna and the University of St. Gallen in St. Gallen, Switzerland. In spring 2004 he was a Fulbright Scholar in the School of Economics and Business, University of Sarajevo, Sarajevo, Bosnia-Herzegovina. Between 1981 and 1988 Umpleby was the American coordinator of a series of meetings between American and Russian scientists to discuss the foundations of cybernetics and systems theory. These meetings were supported by the Russian Academy of Sciences and the American Council of Learned Societies. His interest in the transitions in the post-communist countries has resulted in his presenting lectures at various institutes of the Academies of Science of Russia, Ukraine, Poland, Hungary, and Bulgaria. He received the Norbert Wiener Award of the American Society for Cybernetics.

About the IRDO institute for the development of social responsibility (SR) as an informal promotion of systemic behaviour

http://www.irdo.si
Dr., Dr. Matjaž MULEJ, Prof. Emer. University of Maribor,
IRDO, head of research unit, Maribor, Slovenia, Europe, IASCYS vice-president
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Anita HRAST, M. S., IRDO manager, DOBA College lecturer, Maribor, Slovenia
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Social responsibility provides an informal way of systemic behaviour with its seven principles, ***accountability, transparency, ethical behaviour, respect for stakeholders, rule of law, international norms, and human rights***, that support attainment of SR's three basic concepts: responsibility for influences on society, inter-dependence, and holistic approach (ISO 26000). The IRDO institute is a leading Slovenian organisation that contributes to the development of social responsibility in Slovenia and abroad with research, training, consulting, connecting and promotion. It cooperates with domestic and foreign experts, foundations, organisations, governments and companies and helps with the exchange of knowledge and experience regarding social responsibility. By the year 2020, we intend to become an internationally renowned group of experts, scientists and researchers in the field of social responsibility, making an important contribution to the development of SR for companies, organisations, foundations, individuals, governments and to society as a whole. The IRDO -Institute for the Development of Social Responsibility- was founded in 2004 in order to research and accelerate the development of SR in Slovenia and elsewhere. IRDO's main purpose is to promote the networking of key activists concerning SR, whether in government, business, other institutions and organizations, or civil society, and to share common activities and campaigns for raising awareness in society at large about the need and importance of SR. For this purpose:

- we **create and conduct innovative concepts and projects** in the field of social responsibility, including sustainable development,
- we maintain a **platform for the exchange of knowledge and ideas**,
- we **consult and train companies, organisations and foundations** regarding the introduction of SR strategies**,**
- we **are strengthening a dialogue** with the government, civil society, companies and media for the preparation and realisation of SR strategies, even national ones,
- we **inform the public** about the concept of and various successful projects about SR,
- since 2009 we have been **granting a Slovenian award for social responsibility, Horus**,
- since 2006 we have been **organising an international conference "SR and current challenges**," of which the 13th is taking place on 27 September 2018,
- we **research** the practice of SR in theory and practice,
- we **publish scientific and technical articles** in Slovenia and elsewhere,
- we **publish books,** manuals, booklets, monthly newsletters and other publications,
- we run **MODEL M** enabling youngsters of 26-30 with B.S. for (self-)employment,
- we work with the government of Slovenia on the **governmental Strategy of promotion if SR in Slovenia**,
- we **work with the 'Sustainable and Socially Responsible University of Maribor'** with its SR-related action program for 2014-2020, etc.

Matjaz MULEJ https://en.wikipedia.org/wiki/Matjaz_Mulej

Matjaz MULEJ, after his Doctorates in Economics/Systems Theory and in Innovation Management, used to work at the University of Maribor, where he still works with doctoral students. He works also in other Slovene higher education institutions. He retired in 2001 as Professor Emeritus of Systems and Innovation Theory. For the recent 10 years he has applied systems theory also to social responsibility as personal and organizational attributes – ethics of responsibility, interdependence and requisite holism. He published more than 1.800 publications in over 40 countries. He was visiting professor at foreign universities for 15 semesters, mostly in US, including Cornell (as Fulbright scholar), also in Austria, China, Germany, Mexico, and gave talks in about 50 further universities around the world. He consulted to organizations in 6 countries about 500 times. He is author of **the Dialectical Systems Theory, Innovative Business Paradigm and Methods for transitional countries and enterprises**; many millions of innovation results value are reported. He is a member of the European Academy of Sciences and Arts, Salzburg (2004), European Academy of Sciences and Humanities, Paris (2004), International Academy for Systems and Cybernetic Sciences, Vienna, now in France (2010; establishing former head, now vice- president). He was president of IFSR, president of the Slovene Systems Research Society (since 1991), head of the research unit of IRDO Institute for Development of Social Responsibility. Under his impact University of Maribor became 'Sustainable and Socially Responsible University of Maribor' with an action program for 2014-2020. He was granted all available official awards for his work on non-technological innovations in Yugoslavia, Slovenia, Maribor and University of Maribor. In 2013-2016 he published and edited 9 books, 3 collections of articles (in Systems Research and Behavioral Science, Kybernetes, Systems Practice and Action Research) with more than 100 authors from 30 countries, and 4 conference proceedings, all about **systemic behavior via social responsibilit**y. His most recent award is HORUS platina award for 60 years of volunteering as a practice of social responsibility.

SOCIAL GERONTOLOGY
AS AN APPLIED SYSTEMS BEHAVIOR AND THEORY

Prof. Emer. Dr., Dr. **Matjaž MULEJ**
University of Maribor, Slovenia, Europe, IRDO Institute for the Development of Social Responsibility,
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According to Bertalanffy, the essence of systems theory is the effort of academics and practitioners to help humankind overcome the usual and often dangerous one-sidedness caused by over-specialization into single professions and by related oversights of (often crucial) attributes. Wiener created cybernetics on the same basis, i.e. by creative interdisciplinary cooperation, which changed over-specialization into cooperating specialization. ***Mulej's Dialectical Systems theory*** adds a focus on selection of all and only crucial viewpoints or specializations in a synergy called a dialectical system; it denotes their interdependence due to their mutual differences with which they complete each other up toward the requisite holism (replacing the fictitious holism typical of a single discipline, while a total, i.e. real holism including a synergy of totally all disciplines reaches beyond human capacities, even in a team work).

Such a change toward a dialectical system approach became necessary also in dealing with elderly people. Population's ageing and increasing longevity is a global issue. Social Gerontology as interdisciplinary science is studying the mechanics and mysteries of longevity, aging and population health. A wide range of disciplines are engaging academics and practitioners working on quality ageing. Social gerontologists are human service specialists who advocate for older adults. Today there are many publications on every aspect on social gerontology.

A multidisciplinary understanding of population's ageing is crucial, but not enough, since it may mean application of several disciplines with no or poor cooperation, which is included in an interdisciplinary approach via a dialectical system. Choosing the really crucial viewpoints/disciplines and enabling their creative cooperation is a crucial task of the involved persons. This process can enjoy support from social responsibility's three crucial concepts: one's responsibility for one's impacts over society, i.e. humans and nature, interdependence, and holistic approach, supported by the seven principles, i.e. accountability, transparency, ethics, respect for stakeholders' interests, rule of law, international norms, and human rights.

Matjaz MULEJ https://en.wikipedia.org/wiki/Matjaz_Mulej

Matjaz MULEJ, after his Doctorates in Economics/Systems Theory and in Innovation Management, used to work at the University of Maribor, where he still works with doctoral students. He works also in other Slovene higher education institutions. He retired in 2001 as Professor Emeritus of Systems and Innovation Theory. For the recent 10 years he has applied systems theory also to social responsibility as personal and organizational attributes – ethics of responsibility, interdependence and requisite holism. He published more than 1.800 publications in over 40 countries. He was visiting professor at foreign universities for 15 semesters, mostly in US, including Cornell (as Fulbright scholar), also in Austria, China, Germany, Mexico, and gave talks in about 50 further universities around the world. He consulted to organizations in 6 countries about 500 times. He is author of the Dialectical Systems Theory, Innovative Business Paradigm and Methods for transitional countries and enterprises; many millions of innovation results value are reported. He is a member of the European Academy of Sciences and Arts, Salzburg (2004), European Academy of Sciences and Humanities, Paris (2004), International Academy for Systems and Cybernetic Sciences, Vienna, now in France (2010; establishing former head, now vice- president). He was president of IFSR, president of the Slovene Systems Research Society (since 1991), head of the research unit of IRDO Institute for Development of Social Responsibility. Under his impact University of Maribor became 'Sustainable and Socially Responsible University of Maribor' with an action program for 2014-2020. He was granted all available official awards for his work on non-technological innovations in Yugoslavia, Slovenia, Maribor and University of Maribor. In 2013-2016 he published and edited 9 books, 3 collections of articles (in Systems Research and Behavioral Science, Kybernetes, Systems Practice and Action Research) with more than 100 authors from 30 countries, and 4 conference proceedings, all about **systemic behavior via social responsibilit**y. His most recent award is HORUS platina award for 60 years of volunteering as a practice of social responsibility.

From recovery of cyber-systemic sensibilities to fostering cyber-systemic thinking in practice capabilities: fifty years of experience at the Open University (UK)

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Abstract: We each have a two way relationship with the planet but individually and collectively the quality of this relationship is declining. We collectively face an existential threat. Re-investing in our capabilities to think and act differently is one of the few strategies at our disposal. Cyber-systemic thinking and practice offers the possibility to craft different futures. Experiences from nearly 50 years of developing and providing cyber-systemic education at the Open University (UK) point to the need to retain, or recover, our own human systemic sensibilities. It is important to move beyond sensibility to build cyber-systemic literacy and cyber-systemic thinking in practice capability. An analogy for the cyber-systemic journey is to regain, or strengthen a sensibility for hearing and appreciating music, but, realizing this is not enough, to invest in developing music literacy – the capacity to read and perhaps write music and then to work to develop the capability to put sensibility and literacy into practice, to effect 'good' performances. The talk will draw on the Open University experiences and explore what makes a 'good' cyber-systemic performance.

Raymond ISON

Raymond Ison is a professor of systems at the School of Engineering & Innovation, Faculty of Science, Technology, Engineering & Mathematics, The Open University UK,Walton Hall, Milton Keynes, MK7 6AA, U K , http://www.open.ac.uk/choose/ou/systemsthinking. He is also President of the International Federation for Systems Research (IFSR), a Trustee for the American Society of Cybernetics, and Director of the World Organisation of Systems and Cybernetics (WOSC). Ison focuses on Systems scholarship that draws on second-order cybernetics and the biology of cognition and for developing the use of Mode-2 modalities of research practice. He has made significant contributions in the areas of systemic governance, systems practice and social learning, systemic environmental decision making, 'knowledge transfer', design of learning/inquiring systems and agricultural/food systems. His research has found practical application in diverse fields including water management, organizational change, staff induction, Higher Education reform and rural development. Ison was awarded the Wesley College Foundation Medal by the University of Sydney in 2016. Ison is the author, co-author or editor of six books, nine journal special editions, 37 book chapters, and 137 refereed papers.

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From Science Heritage to Present Design and Future Practice : Prospects for the Development of the Systems Science and Systems Research Field.

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Abstract

Today, the Bertalanffy Center for the Study of Systems Science (BCSSS) is an Austrian independent research institute, internationally acknowledged as an ambassador for the systems science heritage and present state-of-the-art applied systems research. The presentation will highlight the story of a ten years journey that led to this current progress of BCSSS as one independent institution in the context of the economic and political developments in Europe and the strained interplay of academic and practice paradigms.

Today, the BCSSS is dedicated to advancing systems concepts and approaches and to applying them to real world challenges through

- executing and supporting research projects towards systemic innovative solutions for Sustainable Development.
- supporting the next generation of systems researchers with scholarships and awards.
- executing and supporting international scientific forums like the European Meetings on Cybernetics and Systems Research (EMCSR) to foster global networks between researchers and practitioners.
- disseminating systems knowledge by executing and supporting lectures, workshops and publications.
- administrating the archive of Ludwig von Bertalanffy and other collections as well as opening the heritage to the public.

The presentation will emphasize the importance of our shared scientific systems and cybernetics heritage, which is nowadays actively requested by many groups in society. To effectively contribute to present design and future practice challenges in the context of a sustainable development and the interdependent social transformations, we need to enhance our shared heritage.

Thus, the BCSSS invites the IASCYS and other representative organizations in the field to revive and strengthen the impact of systems science and research in practice, to collaborate on and to actively contribute to

- the Ludwig von Bertalanffy & Cybernetics and Systems Archive
- the International Encyclopedia of Systems and Cybernetics
- the development of contemporary systems & data science epistemologies
- the development of current educational modules and curricula

The presentation will furthermore address the need and invitation to collaborate in a systems research peak body, which the International Federation for Systems Research (IFSR) may become. The BCSSS hosts and supports the IFSR now, because we believe in the ideal of a systems movement, as once envisioned by Ludwig von Bertalanffy and others. Policy developments in the domains of technology and engineering, design, economics, social transformation and environment, as well as public service innovation are creating a strong demand for understanding and addressing cross sectoral, multi-stakeholder, transdisciplinary complex challenges.

The BCSSS has already developed relations with international research organizations and European as well as international policy organizations (European Environmental Bureau, European Economic and Social Committee, European Commission, OECD, UN). We are collaborating with the International Council on Systems Engineering on policies development and the development of their body of knowledge for the advancement of systems engineering (e.g. curricula). We have always been connecting our efforts with other systems organizations in the field. These challenges need collaboration and we as systems scientists and researchers should be able to lead by example and overcome disciplinary or domain dependent silos, created by the history of knowledge development and diverse power games. If we are able to unite, we are able to contribute to the societal questions that are raised today, we are able to collaborate on policy, technology and social developments. Together we are able to contribute as humans to humanity, which our founders envisioned as a present-future prospect that we should not miss out on.

Stefan Blachfellner

Stefan Blachfellner is the Managing Director of the Bertalanffy Center for the Study of Systems Science (BCSSS) in Vienna and the Conference Manager for the European Meetings on Cybernetics and Systems Research (emcsr/avantgarde), the appointed Secretary General (former Vice President) of the International Federation for Systems Research (IFSR), and the SIG Chair on Socio-Ecological Systems and Design (former Vice President) of the International Society for the Systems Sciences (ISSS). He is founding editor of the journal Systema: Connecting Matter, Life, Culture, and Technology, author, guest editor and reviewer for several international peer-reviewed journals and reputable publishers (Springer, Oxford University Press, Routledge).
He has broad international experience as an entrepreneur and business consultant in Fortune TOP 500 industries, and the service sector as well as in public administration and cultural and educational organizations. He has taught entrepreneurship, leadership, creativity and innovation management, digital business, future studies, and various systems theories in practice at several Universities and in professional management training programs in Austria, Germany, France, China and the USA.
From 2016 to 2018 he was appointed as Special Adviser to the European Commissioner for Transport to prepare advice on infrastructure, data, apps, services and networks in the context of multi-modality towards a European Digital Eco-System for Intelligent Multimodal Transport Systems. He is regularly requested to contribute to diverse professional, governmental and non-governmental organizations in policy developments and innovation towards the Sustainable Development Goals.
His current work with and in international research teams is focused on the development of a General Systems Transdiscipline, Systems Design, Systemic Innovation and Impact Assessment to improve methods for addressing complex challenges towards the so-called Next Economy.
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Trying to stabilize the population and mean temperature of the World

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Abstract

It is a fact that population and mean temperature of the world grow fast. Literature shows that many studies have been performed about it. Nevertheless, forecasts are not good. Assuming that the key implied factors are the consumption of energy (from the different types of energy sources) and the birth rate, we suggest in this research, as a first step, to state a stochastic demographic model, including the necessary and adequate economic, environmental and well-being variables. This model will be able to optimize, by means of a genetic algorithm, the amount and proportion of the main source types energy consumption as well as the average birth rate in the world, in order to maintain the global present population and mean temperature. The input variables to be optimized (control variables) are the consumptions of: coal, oil, gas, nuclear energy, and renewable energies, as well as, forest area and the birth rate. The scenarios in which to perform the optimization processes (non-controlled variables) are defined by the Human Development Index. The evolution of other variables such as, for instance, unemployment, carbon dioxide production, gross capital formation, water cycle, etc. is obtained as collateral information.

Keywords: global warming; energy consumption types; stochastic demographic model; genetic algorithm; optimization.

Antonio CASELLES

Antonio Caselles has been the Vice President of the "Sociedad Española de Sistemas Generales" (SESGE), the Spanish Society for General Systems, which is a member of the International Federation for Systems Research and the European Union for Systemics. He has also been the Director and Editor of the "Revista Internacional de Sistemas" (International Systems Review), a publication of SESGE. Caselles is interested in the construction of logical-mathematical models which attempt to reproduce the structure and behavior of complex social, biological or ecological systems. These models, as computer programs, allow managers to simulate intervention strategies. He focuses on the automatic programming of computers including search functions that interrelate several variables (***data mining***). Caselles is the author of more than 100 articles published in scientific journals or as book chapters about systems theory and its applications to real-life problems, especially socio-economic, ecological and psychological problems. He has conducted diverse research projects with competitive public financing and has consulted with private companies and government agencies. He is the author of the books: ***Control del desempleo por Simulación*** **and** ***Modelización y simulación de sistemas complejos***.

Enabling local people and groups to support global organisational development

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Abstract

The World Organisation of Systems and Cybernetics (WOSC) aims to contribute to the future of humanity. For this purpose, it is currently organising in Moscow, in collaboration with the Russian Academy of Sciences, WOSC 2020, from the 16th to the 18th of September, 2020. Our aim in this Congress is to bring CyberSystemic scientists together with politicians, practitioners and students to debate at all levels, from local communities to global societies, pressing economic, social and ecological problems of humanity. In this contribution I want to advance, in one aspect of the Congress, that of organisational development.

WOSC 2020 will provide space for discussions of philosophical and methodological aspects of systems and cybernetics, highlighting the cybernetics of democracy and governance, the cybernetics of weaving people and technology, and the relevance of transdisciplinary knowledge. It is in this context that I make the following contribution to the IASCYS meeting to be held in Beijing, from the 10th to the 12th of May of this year.

Our organisations emerge from networks of autonomous people engaged in interaction processes (Espejo & Foss, 2018). People, in collectives, use their skills, resources and capabilities to create and produce whatever outcomes they may wish to achieve. Collaboration in these interactions, to a significant degree, depend on processes of self-organization. In general there is no one with authority to tell all of them what to do and how to interact; they just interact. Often these interaction are inadequate and it is only through learning processes, which depends on cues and signals, that they proceed towards desirable outcomes. To a degree this is the dynamics of organisational development to respond to environmental, social, and economic pressures. Self-organising processes are at the core of their interactions. In today's world technologies, digital and others, are transforming these interaction processes. New forms of communication and relationships are emerging between people and their environments; these are processes towards the constitution of effective organisational systems (Beer, 1979, 1985), (Espejo & Reyes, 2011).

However, these systems are more than the outcome of bottom-up self-organisation; they are also, the outcome of guided self-organisation, which, through policies clarify purposes and help to speed up learning processes by enabling relating fragmented resources. Organisational development and problem solving require of both; bottom-up and top-down interactions. The challenge is working out which interaction strategies are necessary to increase response capacity to make sense of an often overwhelmingly complex surrounding. These are aspects related to Ross Ashby´s law of requisite variety (Ashby, 1964). We learn to manage these interactions often at a high cost to people and organisation; hierarchical structures tend to concentrate responses to environmental challenges at the top of the organisation. On the other hand heterarchical organisations try to distribute response capacity and self-organisation throughout the collective, but often their local response capacity is limited by resources. However, current information and communications technologies are increasing the chances of making this distribution effective and the purpose of this contribution is to discuss how to move from top-down structures, which restrict learning at the top, to heterarchical structures which increase learning capabilities throughout the structure.

It is through self-organisation, functional specialisation and coordination, supported by current technologies, that people locally and at all structural levels, learn to correct complexity imbalances among them and between them an environmental agents.

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Professor **Raul Espejo** is an international expert in organisational cybernetics.

His most recent book "Organizational Systems: Managing Complexity with the Viable System Model" was published by Springer early in 2011 (co-authored with Alfonso Reyes) and is co-author of two other books and co-editor of three. He has published over a 100 articles in journals and books.

In the early 70s, during the Allende's government in Chile, he was Operational Director of the CYBERSYN project under the scientific direction of Stafford Beer. Since then until 2003, he worked at the Manchester Business School in the UK, the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria and the universities of Aston and Lincoln in the UK. In 1985 he created in the Science Park of Aston University Syncho Ltd, an enterprise in the field of organisational cybernetics. From there he has done research in collaboration with a wide range of institutions worldwide, mainly in organisational diagnosis and design, with a focus on social transformation, organisational learning and democratic processes.

Currently he is President of the World Organization of Systems and Cybernetics http://wosc.co and Director of Syncho Ltd in the UK.

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Better Individual Healthcare and Welfare with Foot Reflexotherapy and Energetic Chronotherapy

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Abstract

The core of the Taoism philosophy of the optimal ***balance between Yin-Yang*** is the same as the ***meden agan*** Antique Greek philosophy [3]. Both agreed that ***sustainability*** is obtained neither through a greater ***efficiency*** (yang excess) nor through a greater ***resilience*** (yin excess) but with an in-between optimal balance, a ***window of viability***. From their experience of interactions between Man and Nature, particularly in agriculture and health, the Chinese ancestors pointed to the ethics of ***the harmony and the order***. Confucius said: *"harmony is over all"*. To maintain the harmony between Man and Nature is the systemic way for sustainability and Societies have to respect the laws of Nature [6]. Taoism principles made their proofs in ***ecology*** [7], which is the economy of Nature: too little diversity (yang excess) leads towards breakage, too much (yin excess) leads to stagnation, and in ***economy***: complementary currencies of diverse types enable economy to flow back towards greater sustainability [12]. Unless proved otherwise, every living system is rhythmic. Biological rhythms are essential components of ***homeostasis***, and ***periodicity*** is inherited. Major pathologies result from ***rhythm disruption***. Drugs show rhythmic variations in pharmacokinetics and pharmacodynamics [1]. Drugs abuse makes money but has triggered antibiotic resistances and environmental pollution [4]. Other ways for ***quality-of-life restoration*** are needed [10]. Since 5000 years, with antique ***Egyptian medicine and traditional Chinese medicine***, foot reflexotherapy was experimented and taught, with success. With time the energetic principles were forgotten and it was misapplied and rejected by modern occidental chemical medicine. But with the failure of more and more aggressive treatments it was re-discovered. Foot reflexotherapy can be used for ***diagnosis*** and as a tool [8] for chronic pain, vascular flow and lung or breast cancer treatments [13]. In a study, with a significant number of patients, 100% improvement was found [11]. **How to summarize what the research knows? How to use reflexotherapy tools? How to prove their efficiency?**

Energetic reflexotherapy results of 12 years of monitoring, with 8 to 85 years old men and women, taking drugs or not, were randomized against foot massage or non-energetic reflexology results [9], as ***'placebos'***, and general practitioner, acupuncturist, physiotherapist, rheumatologist, endocrinologist, neurologist or osteopath,results, as ***'controls'***. Improvements were ***significant*** for: -exhaustion, insomnia, night awakenings, anxiety, hypersensitivity, depression, stress, agitation, confusion, dizziness, ictus, memory loss, headaches, migraine, -cognitive or motor dysfunction, traumas; -anorexia, loss of appetite, excess weight, obesity, -sugar or tobacco addiction, perverted taste sensation; -diarrhea, constipation, intestinal obstruction, abdominal discomfort, flatulence, colitis, -stomach discomfort, irritation, ebb or ulcer, dysphagia or dyspepsia, nausea, vomiting; -too low or too high blood pressure, palpitation, -low blood flow, venous or lymphatic drain disorders, edemas, haemorrhoids, veins varicose, syndrome of Raynaud; -hormonal disorder, pineal, pituitary or hypothalamus disorders, libido disorders; -bone, muscle, nerve or vessel pains, cramps, sciatic pain, facial neuralgia; -allergy, inflammation, skin disorders, eczema, acne, lupus; -osteoporosis, osteoarthritis, rheumatisms, fibromyalgia, hernia; -rhinitis, bronchitis, emphysema, asthma, -apnea, mucositis; -nephrite, cystitis, incontinence, -pancreatitis, diabetes; -kidney cysts, thyroid nodules.

Taking into account ***chronobiology*** [2], ***reflexotherapy*** not only get success in diagnosis and treatments but also can be used to evaluate the efficiency of other therapies like ***lithotherapy*** [5]. Periodicity is a key component of therapy evolution and evaluation. Harmony preservation is governed by means of ***the law and the order***. Our body is a living system of systems [3], a society of cell actors, that must be governed by the order, what allows to establish a hierarchy, a system of ***energetic controls***, laws that govern physiological relations and survival rules [6]. Every parts of our body are interacting together, for the best and for the worst. Only treating the right part, but ***in the right way and at the right time*** means to treat the whole body [5]: ***'interaction is construction, construction is interaction'*** [10, 3].

keywords: agoantagonism, energetics, ethics, harmony, health, homeostasis, interaction, longitudinal chronobiology, lithotherapy, reflexology, randomized controlled trials, rhythms, sustainability, systems science, wu-li shi-li ren-li, yin-yang

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Pierre Bricage, retired professor of Biology and Health and Social Sciences Engineering at the Université de Pau et des Pays de l'Adour, France, Europe, has made contributions in the fields of biology and ecology through teaching and researching in plant, animal and ***Human biological rhythms and physiology.*** He has researched the ***biochemical, ecological and genetic determinisms*** of growth and development. Focusing on the ***sustainable management of natural resources, environmental education***, systems, and applied micro-informatics, he contributed to the fields of ***engineering, technology and informatics***. His works on biotechnology include patents, co-contributions of bacterial strains, chemicals, quality control methodology and softwares. He has led training programs on governance, educative information and communication numeric technology. His contribution to the field of ***health engineering*** includes an AIDS curative vaccine methodology and a cancer curative vaccine one. In the field of ***societal engineering***, he has researched topics such as associative governance, anthropo-politics, territorial system governance and ***systems evolution***.

Pierre Bricage has published more than 250 works in over 20 countries. He has been appointed Vice-President of the French Association of Systemics and Cybernetics (AFSCET). Past deputy Secretary General of the European Union for Systemics (UES-EUS) during 4 years, past Director of the World Organisation of Systems and Cybernetics (WOSC) during 6 years, he currently serves as the IASCYS Secretary General since 8 years.

COULD A SYSTEMIC APPROACH PREDICT THE SOCIAL ROLE OF WOMEN IN THE FUTURE? : AN ATTEMPT ON SOCIOEVOLUTIANY BASES.

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ABSTRACT

The problem of male/female discrimination is undoubtedly one of the most serious humanity has. Of the 7.5 billion inhabitants who registered on Earth in 2017, more than 50% are women, and of them their almost totality does not enjoy equal rights and obligations of men. One would only have to give a review of the female participation in the positions of responsibility following the known dominant elites (Pareto) to wonder how many women are executive presidents of the large multinationals, how many are general of the Armies, how many executive heads of great churches, and so on in almost every institution with effective power in society. But one of the objectives of the systems theory (since it parts of the totality of the variables at stake) is to offer practical solutions to the problems. The systemic approach presents here two complementary causal models following the Soft Systems Methodology of P. Checkland which in its entirety is developed in three phases: a) causally modeling the problem to better understand and explain how socially we reached the Current status of women; b). To point out the real difficulties of the problems by having to confront the enormous contradiction between a hard-to-overcome biological determinism and a social organization that, although it has remained in a traditional patriarchal line during Centuries, may be voluntarily modified; and c) to point out a compensatory model which may well begin by sweetening, alleviating or eliminating the problem in terms of the efforts of different societies and their respective governments..

Keywords: Systemic Epistemology; Knowledge; Technological development; Integrated Personalism.

Francisco PARRA-LUNA

Francisco Parra-Luna is an academician who has been president of and/or founded many systems theory organizations such as the **Association Internationale des Sociologues de Langue Francaise**, the **Sociedad Espanola de Sistemas Generales**, and the **Instituto Univesitario de Recursos Humanos**. He is also a member of the editorial board of the journal Systems Research and Behavioral Science. Parra-Luna is the founder and was the first president of **the Sociocybernetics and Social Systems Theory group in the International Sociological Association**. Parra-Luna has authored 19 books and more than 50 articles. Parra-Luna has won several prizes and distinctions including first prize from the Fundación Rumasa in 1979, second prize from the Institute de Estudios Laborales in 1979, the Prize del Centro de Investigaciones Sociológicas in 1982, the national prize on “Marketing político” in 1983, and the national prize for “Martin Artajo” on Employment Politics in 1987. He also had a square in the town Villanueva de los Infantes, Spain dedicated to him in 2010.

Beijing (PR China), the Academy of Mathematics and System Sciences, IASCYS meeting, 10-12 May 2019.
Research, Development and Education in Systems Science and Cybernetics: paradigms, models and applications.

Second order systems: cybernetic foundations for the social sciences.

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Abstract
This paper presents a theory of second order systems with a view to showing how it may serve as foundations for the social sciences. Currently, with rare exceptions, penetrations of cybernetic and systems theoretic concepts into the social sciences have been sporadic and, arguably, conceptually confused. The aim of the theory is to mitigate this lack and these confusions by providing a coherent conceptual framework that can bring order and transdisciplinary unity. I provide examples of the theory's relevance for key topics in the disciplines of psychology, sociology and cultural anthropology (consciousness, communication, observation and reflexivity). I also review some examples of existing applications of cybernetics and systems theory in the social sciences and indicate their shortcomings. I show how the conceptual framework can ameliorate them. My critiques and proposals are intended to serve the transdisciplinary and metadisciplinary aims of cybernetics and the systems sciences of bringing order and unity to other disciplines. I believe my proposals are helpful also in understanding the relations between theories and concepts in cybernetics and the systems sciences. I briefly provide some justifications for this view. Topics covered include: the emergence and ontogeny of second order systems, the dynamics of second order systems, the interaction of second order systems and second order systems theory applied recursively to individual social actors, families, organisations, cultures and social systems.

Key words systems sciences, social sciences, second order cybernetics, second order systems

Bernard Scott is Gordon Pask Professor of Sociocybernetics at the International Center for Sociocybernetics Studies. He is also a member of the editorial advisory boards of the journals *Kybernetes*, *Cybernetics and Human Knowing*, *Campus-Wide Information Systems* and *Constructivist Foundations*. While in school Scott worked with his supervisor, Gordon Pask, to develop "conversation theory" and associated cybernetic models of learning and teaching, build interactive learning environments and carry out extensive empirical studies of how humans learn.
Scott has authored over 130 publications.

Scott is a fellow and founder member of the U.K.'s Cybernetics Society, an Associate Fellow of the British Psychological Society, and a Fellow of the American Society for Cybernetics. The American Society for Cybernetics also awarded him the McCulloch Award in 2013.

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Research, Development and Education in Systems Science and Cybernetics: paradigms, models and applications.

'Hosting Capacity' vs 'Capacity To be Hosted':
Emergence and Maintenance of Sustainability.
The living systems keystone solution: **ARMSADA**
Associations for the Reciprocal and Mutual Sharing of Advantages and DisAdvantages.

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According to the first report (*a 3 years work of 150 researchers from 50 Countries*) of the 7th session of the Intergovernmental Science-Policy Platform on Biodiversity and Environmental Services **IPBES**, this week in Paris, France, Europe, all Earth living systems are endangered by Man activities! **"We have lost the link. We become foreign to the Natural world." (Wangari Maathai)**. How to open our eyes to tomorrow?

What can we learn from studying the functioning of living systems?

Every living system is made of 3 entities: actors, a Whole, and interactions between actors and actors and their Whole. The system's ***ecoexotope*** (its external space-time of inhabitation) is furnishing a ***'hosting capacity'*** to the system's ***endophysiotope*** (its internal space-time of functioning) which survival is depending on its ***'capacity to be hosted'***. Both must be in adequacy. That implies limitations and adaptability to limits changes. There is only one solution: systems merging into new system-of-systems, new blueprints, in which all partners and their Whole are sharing advantages and disadvantages, in which they are both winners and losers.

Whatever the system-of-systems, number growth X and mass growth Y are correlated and limiting each other according to a power law $XY=K$. When the number of parts of a pie is increasing, we know that the size of each part is decreasing. That is a well-known economic law: when quantity Q increases, quality q decreases, $Qq=C$. So, sooner or later, **"It will be very difficult to maintain the supply of food and raw material." (James Lovelock).** If we want to survive, **"We need to reconsider both our relationship with Nature and our relationship with ourselves, with our society." (Edgar Morin)**. Everywhere Man species is able to increase the hosting capacity of its ecoexotope of survival. It has be done, and is still going on, more and more. But there are never advantages without disadvantages, and ***the greater the advantages, the greater the disadvantages***. Man species activities are increasing more and more climate change. Drought and pollutions in air, waters and soils, are increasing. Domestic plants and animals species are endangered. And Man species is endangered too. But things are not changing. **"Conflict between Man and Nature has been increasing to an extent likely to undermine the very foundations of Life on Earth." (Mikhaïl Gorbachev)**. Man is a very endangered species! Can we do something about that? Matter and energy are used without limits by Man species, to produce more and more men, and only for Man species survival! **"We have to understand that we are approaching a bottleneck." (Edgar Morin).** Can we do something to slow down this process?

How are all living systems functioning since billions of years?

Do look for example at viruses. Viruses are predators which eat bacteria as preys. But when all bacteria are eaten, there is no more matter and energy and no active living system to produce any virus. When there is nothing else to eat, the viral species will disappear. It is a ***'who wins loses game'***! How to escape from this ***'who wins-loses game'***? Living **systems-of-systems** developed **ancestral alliances** that emerged after predator-prey struggles, like the viruses-bacteria struggle for survival. They allowed mutual survivals of the antagonistic enemies by their merging into a new Whole, ***a new blueprint***, an **ARMSADA**.

But only when they both simultaneously lost the capacity to kill the other one.

"For one to survive, the other one must survive first."

Do look at a lichen. The body of a lichen is the body of an ancestral free living fungal species. Into this body, a population of an ancestral free living algal species is hosted. The fungal partner furnishes a hosting capacity to the algal guest which owns a capacity to be hosted in adequacy. The endophysiotope of the fungus is the ecoexotope of survival of the endophysiotope of the algal cells. It is a great advantage for the algal cells that are protected against drought, viruses and bacteria by the fungal body. But it is a great disadvantage for the fungus which must take a great part of its matter and energy to allow the survival of the algal cells. But, sooner or later, fungal filaments are catching algal cells and they eat them. Now it is a great advantage for the fungal part and a great disadvantage for the algal one. ***All that is an advantage for a partner is a disadvantage for the other one and reciprocally. There are never advantages without disadvantages. The greater the advantages, the greater the disadvantages. Both are winners and losers too. It is not an association for mutual benefits***, but an Association for the Reciprocal and Mutual Sharing of Advantages and DisAdvantages (ARMSADA). If benefits, they are for the Whole, the lichen. And for ***the Whole to survive, each partner must survive first and reciprocally***. Mass growth and number growth of both the parts and the Whole are ***long lasting as long as they are supported by every partner and supportable for every partner and the partner-of-partners too***. Only reciprocal rewards stabilize cooperation. But win-win situations don't exist. You can never always be a winner. Sooner or later, you will be a loser too. Sooner or later, the greater the advantages, the greater the disadvantages.

<u>Anthropo-Systems versus Wild Systems: antagonism towards ago-antagonism?</u>

ARMSADAs are everywhere; ***in all living, past, present, and future blueprints***: endogenous bacteriophages, endogenous retro-viruses into the nucleus of cells, plant cells endogenous compartments, legumes nodes, lichens, ecosystems. Man species was able to enter into ARMSADA deals with plants and animals species at the origin of agriculture. But the deals were broken with industrial mass producing technologies. The *HOSTING capacity* was carried too far, without limits. So, the *capacity to be HOSTED* decreased to the worst, because ***HOSTINGxHOSTED=k***. Man controlled anthroposystems have the most productive capacity, with a very low latency, but the least biodiversity and only 1 keystone species: Man. Their health is highly poor with only a local autonomy. Wild ecosystems are ancient, with a high biodiversity, a high resilience capacity. They are robust; as ARMSADA they are experienced in life survival, but they have enough production only for their own, not for Man which is usually an invading species. Limits and limitations are controlling all the partners growth, in mass and number: HOSTINGxHOSTED=k. All living ***systems-of-systems*** are ecosystems in which partners are making "E PLURIBUS UNUM", "IN VARIETATE CONCORDIA", "UNUS PRO OMNIBUS, OMNES PRO UNO". Matter and energy processes are open in ***Take-Make-Waste-Recycle*** ways. In their Whole, ***partners are linked together for the best and for the worst***.

The endogenous viruses, into our genome, are ***constrained dangers*** that can be freed when our cells are endangered, like the symbiotic hosted bacteriophages are released when their hosting bacterium is endangered. These ***un-controlled***, ***de-controlled*** dangers induced damaged cancer cells proliferation.

A forest is an ecosystem in which dangers, like caterpillars of butterfly species, are damaging trees, eating their leaves. It is also ***a who wins loses game***. If too much leaves are eaten, trees will die and the butterfly species will disappear. Through forests evolution a balance arose between predators (the caterpillars) and preys (the trees). A sufficient biodiversity is needed for the survival of the forests as a Whole, ***enough but not too much: "meden agan"***. When the hosting capacity is increasing, usually by making from the forest a field of trees, pest dangers increase too.

And a single pest can kill this field of only 1 plant species. If we don't know the forest balance -which is a unique one for every forest-, when engineers are cutting or planting a tree species, they usually don't know what could be the result for the forest survival. Depending only on the local forest structure, that could be ***the best or the worst***. The sustainability in economic processes obeys the same laws as in ecologic processes. That is the core of the Taoist worldview. Chinese philosophy describes an optimal balance between ***yin-yang*** as the ancient Greek did: "meden agan". ***Excess is always unbalance!***

Excess in mass industrial breeding led to the emergence of more and more new influenza viruses in pigs and hens breedings, with more and more frequent flue epidemics in men. With more pigs and hens to eat for men, there are more and more pigs, hens and men to eat for the virus. By cutting the equatorial wild forests, in Africa or Latin America, Man species induced the emergence of eating man viruses, such as the Ebola virus which ecoexotope of survival was destroyed through forests destroy and which next ecoexotope could be Man endophysiotope.

The trans-disciplinary, holistic, way of education in systems thinking is a key solution to understand that we must change our minds. "**You never change things by fitting against the existing reality. To change something, build a new model that makes the existing model obsolete. (Buckminster Fuller).** That is exactly what Nature has been doing since billions of years, at any time. To survive, every living systems has to enter into an ARMSADA. It is an exam every living species has to pass, sooner or later, again and again. If it fails, even only once, it is eradicated. Currently, Man species is an obsolete model. Maybe the new ARMSADA model is on the way, but without us!

References

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