国际系统与控制科学院学术年会

2019 International Conference for International Academy for Systems and Cybernetic Sciences

Program

10-12 May 2019

Venue:Academy of Mathematics and Systems Sciences, Chinese Academy of Sciences, Beijing, P.R. China

Sponsor: International Academy for System and Cybernetic Sciences

Organizers: Center for Forecasting Science, CAS

Academy of Mathematics and Systems Science, CAS

School of Economics and Management, UCAS

Co-organizers: Systems Engineering Society of China (SESC)

《Management Review》

Contents

1. Message from Conference Chairs

On behalf of the organizing committee, we are delighted to welcome you to the International Academy for System and Cybernetic Sciences (IASCYS) in the wonderful Beijing, Capital of China.

Academy of Mathematics and Systems Sciences (AMSS) is honored to host this conference. Founded in 1999, AMSS is one of the Research organizations in Chinese Academy of Sciences and is among the most important research organizations in China doing research, and education.

The International Academy for Systems and Cybernetic Sciences (IASCYS) was founded in 2010. The first assembly of IASCYS was held at Sichuan University in Sichuan Province, China during 24-27, October 2010. The second assembly was held at Austrian Research Institute for Artificial Intelligence (OFAI) in the city of Vienna, Austria on 25th April 2014. Sichuan University held two international conferences of IASCYS again in Chengdu during the 22nd to the 26th, October 2015(Third) and 20-23rd ,October 2017. (Fourth). The main theme of this conference (Fifth) will be “Systems theory and Cybernetics: Development and Education” .

We are looking forward to sharing a pleasant, interesting and fruitful conference with you, and we hope that you will find the conference and your stay in Beijing both valuable and enjoyable.

Conference Chair, Jifa Gu
Professor, Academy of Mathematics and Systems Science, CAS
Academician of International Academy for Systems and Cybernetic Sciences
Academician of International Eurasian Academy of Sciences

Conference Chairs, Shouyang Wang
Professor, Academy of Mathematics and Systems Science, CAS
Dean of School of Economics and Management, UCAS
Director of Center for Forecasting Science, CAS
Academician of Third World Academy of Sciences
Academician of International Academy for Systems and Cybernetic Sciences

2. Committee

2.1 Scientific Committee

Stuart UMPLEBY (Chairman)

Stefan BLACHFELLNER (Austria)

Pierre BRICAGE (France)

Guangya CHEN (陈光亚, China)

C.L. Philip CHEN (陈俊龙, China, MACAO)

Ockie BOSCH(Newzeland)

Raul ESPEJO (UK)

Jifa Gu(顾基发, China)

Ray Ison(UK)

Mulej Matjaz(Slovenia)

Shouyang WANG (汪寿阳,China)

2.2 Organizing Committee

Yi HU (Chairperson)

Yunjie WEI (Vice-Chairperson)

3. Conference Programme

May 10, 2019 (Friday)	
14:30-17:00	**IASCYS EC Meeting (Liaoning Hotel, Pierre Bricage' Room)**
18:00-19:30	**Reception** **(Room V1, Huihanggudao Restaurant, on the second floor of Junma Hotel)**
May 11, 2019 (Saturday)/Venue: Meeting Room 204	
09:00-09:30	**Opening Ceremony** Chair: Pierre BRICAGE Addresses of Leaders (On behalf of AMSS, IASCYS, SESC respectively) Group Photo
09:30-10:00	**Tea Break**
10:00-12:00	**Plenary speeches** **(Each 40 minutes)*** **Chairman：Shouyang WANG** **Stuart UMPLEBY (USA)** Some Examples of How Systems and Cybernetics Can Contribute to Traditional Disciplines **Raul ESPEJO (UK)** Enabling Local People and Groups To Support Global Organisational Development **Ray ISON (UK)** From Recovery of Cyber-Systemic Sensibilities to Fostering Cyber-Systemic Thinking in Practice Capabilities: Fifty Years of Experience at The Open University **C. L. Philip CHEN (陈俊龙, CHINA, MACAO)** Data Modelling and Analysis using the New Discriminative Broad Learning System

12:00-13:30	**Lunch Break**
13:30-15:30	**Plenary speeches** **Chairman：Jifa GU** **Stuart UMPLEBY (USA)** The Mission of the International Academy for Systems and Cybernetic Sciences: Some Recent Discoveries **Pierre BRICAGE (France)** 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.) **Stefan BLACHFELLNER(Austria)** From Science Heritage to Present Design and Future Practice: Prospects for the Development of the Systems Science and Systems Research Field
15:30-16:00	**Tea Break**
16:00-17:30	**Chairman: Ray ISON** **Jifa GU (CHINA)** Wuli-Shili-Renli-System Approach and Third Order of System Science **Stuart UMPLEBY (USA)** Closing Speech
18:00-19:30	**Dinner Party** **(Room V1, Huihanggudao Restaurant, on the second floor of Junma Hotel)**
May 12, 2019 (Sunday)/Venue: Meeting Room 205	
09:00-12:00	**Internal Meeting of IASCYS**
12:00-13:30	**Lunch Break**
13:30-18:30	Academic tour
18:30-20:00	**Dinner** **(Room V1, Huihanggudao Restaurant, on the second floor of Junma Hotel)**

* Thirty minutes for talk and Ten minutes for question & answer.

Please copy your PowerPoint or pdf file to the computer before the conference beginning.

4. Abstracts Collection

Stuart A. Umpleby

Prof. Stuart A. UMPLEBY (U.S.A.)
Professor of Department of Management School of Business, George Washington University, Washington DC, USA;
Visiting scholar at Wharton School of University of Pennsylvania;
Visiting Scholar at University of Szt. Gallen, St. Gallen, Switzerland
Visiting Professor at University of International Business, Almaty, Kazakhstan (instructor and adviser for a new PhD program)
Academician, President of International Academy for Systems and Cybernetics Sciences;

1. Some Examples of How Systems and Cybernetics Can Contribute to Traditional Disciplines

ABSTRACT

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.

2. **The Mission of the International Academy for Systems and Cybernetic Sciences: Some Recent Discoveries**

ABSTRACT

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.

C. L. Philip Chen (陈俊龙)

Prof. C. L. Philip Chen
FIEEE, FAAAS, FIAPR, FCAA, FHKIE
Member of Academy of Europe (AE), European Academy of Sciences and Arts (EASA),
Academician, International Academy for Systems and Cybernetics Sciences;
Editor-in-Chief, IEEE Trans. on Systems, Man, and Cybernetics: Systems
Philip.Chen@ieee.org

3. Data Modelling and Analysis using the New Discriminative Broad Learning System

ABSTRACT

After a very fast and efficient discriminative Broad Learning System (BLS) that takes advantage of flatted structure and incremental learning has been developed, this talk will address data modeling with outliers and labeling errors. A robust broad learning system (RBLS) will be derived by assuming the regression residual and output weights follow their respective distributions and the output weights for robust modeling can be determined by maximum a posterior estimation. Then the robustness of RBLS can be enhanced further by integrating the regularization theory. In addition, the framework of several BLS variants with their mathematical modellings will be given. The variations include cascade, recurrent, and broad-deep combination that cover existing deep-wide/broad-wide structures. From the experimental results, the BLS/RBLS and its variations outperforms several exist learning algorithms on regression performance over function approximation, time series prediction, face recognition, and data modelling.

Pierre Bricage

Prof. Pierre BRICAGE
Professor of UPPA, Pau, France
Professor of Education Sciences Engineering, New Technologies Teaching and Training;
Professor of Environmental, Health and Societal Engineering,
Bio-Socio-Systemics;
Acadimician and Secretary General of International Academy for Systems and Cybernetics Sciences.

4.'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)

ABSTRACT

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.

Anthropo-Systems versus Wild Systems: antagonism towards ago-antagonism?

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!

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Stefan Blachfellner

Managing Director, Bertalanffy Center for the Study of Systems Science, Vienna, Austria,
Managing Director, European Meetings on Cybernetics and Systems Research, Secretary General, International Federation for Systems Research, Vienna, Austria,
SIG Chair on Socio-Ecological Systems and Design, International Society for the Systems Science

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

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.

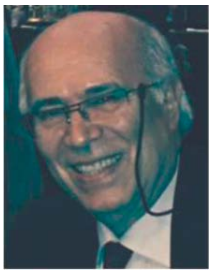
Thus, the BCSSS invites the IASCYS and other representative organizations in the field to revive and strengthen the impact of systems science and research in practice, to collaborate on and to actively contribute to

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.

Raul Espejo



Prof. Raul Espejo
President of the World Organization of Systems and Cybernetics (WOSC)
Director of Syncho Research, UK.
Academician of the International Academy for Systems and Cybernetic Sciences
Past Professor of Systems and Cybernetics at the University of Lincoln, UK.

6. Enabling local people and groups to support global organisational development

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, depends 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 interactions 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 environmental agents.

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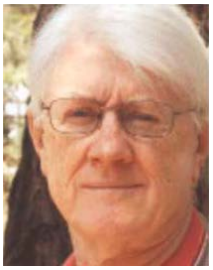
ABOUT THE KEYNOTE SPEAKER

Professor Dr. Raul Espejo is President of the World Organization of Systems and Cybernetics (WOSC) and Director of Syncho Research, UK. He is academician of the International Academy for Systems and Cybernetic Sciences (IASCYS) and Past Professor of Systems and Cybernetics at the University of Lincoln, UK. His research is in organisational cybernetics and systems. His most recent book is “Organizational Systems: Managing Complexity with the Viable System Model” (2011 in English and 2016 in Spanish (both with A. Reyes)). Additionally, has co-published five books and edited 7 special issues of journals, most recently in 2018, of Futures (“Futures of Society: the interactions revolution”). Has published over a 100 papers in journal and books. Has organised two of WOSC’s most recent world congresses in 2014 (Colombia) and in 2017 (Italy). From 1971 to 1973 he was operations director of the CYBERSYN project - the project of the Chilean Government for the management of the industrial economy, under the scientific direction of Professor Stafford Beer.

Ray Ison



Prof. Ray Ison
Professor of Open University (UK)

President of International Federation for Systems Research
Academician, International Academy for Systems and Cybernetics Sciences;

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

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.

Jifa Gu

Prof. Jifa Gu
Prof. Academy of Math. & System Science, CAS
Academician of International Conference of Systems and Cybernetic;
Academician of International Eurasian Academy of Sciences

8. Wuli-Shili-Renli-System approach and third order of System science

ABSTRACT

In 1978 Xuesen Qian and Guozhi had proposed the matter(Wu) has the Theory of physics, doing affairs(Shi) has the theory of Shili , such as Operations research, cybernetics, management science and systems engineering Wuli means theory of physics(in general sense), Shili means theory of Management science, Systems Engineering. Then Yazhi LI suggested add the Renli- theory of Humanity, motivation. But in the end of 1970’s and the middle of 1980’s The systems engineering in China, like in US and Europe,Scholars in this field were paid much attention into Engineering object not too much care on human factors, but with the input of soft system methodology and many practical project linked with the social systems or many projects related to the human factors heavily, people started to pay attention to investigate the human factors and their theory. In 1995 Jifa GU and Zhichang had formally proposed the Wuli-Shili-Renli-System approach, which integrated the Wuli ,Shili and Renli all together , we call it as one of Oriental Systems approach, since it combine with Oriental culture and tradition. So assume that the movement not only from hard to soft (Checkland idea since the start of 1980’s), but from soft to Orient(since the start of

1990's). Here if we give another explanation of Wuli- objective, Shili-subjective and Renli-intersubjective. It means if we wish solve a complex system issues, we will start investigate their objective side-Physics, then our researcher uses our subjective idea to describe the object , finally since any issue related to the society judgement and recognition, also social imports are required-Renli. Especially in China we couldn't only follow the West idea and culture we have to use our oriental tradition, culture. We find it seems has good correspondence between WSR and the third order of System science.

ABOUT THE SPEAKER

Jifa GU, Professor ,Academy of Mathematics and Systems Sciences, Chinese Academy of Sciences, Bachelor, Peking University (1957), PhD, Institute of Mathematics, USSR Academy of Sciences(1963), working in the fields of Operations Research and Systems Engineering. He published more than 30 books and 200 journal papers. He participated in practices on missile, energy, environment, water resource, regional strategy and various projects on evaluation. 1995 with Dr. Zhu ZC proposed Wuli-Shili-Renli system approach and got applications in many practical cases. In recent ten years he has engaged in the study and application of Meta-synthesis system approach and Knowledge Science. He has participated in several national research programs related to social issues, digging experiences from TCM veteran doctors and study on the collective behaviors in Shanghai World Expo. He had been President of Systems Engineering Society of China, President of International Federation of System Research. Now he is academician and vice president of International Academy of System and Cybernetics Sciences, academician of Euro-Asia Academy of Sciences.

Antonio Caselles and Maria T. Sanz

9. Trying to Stabilize the Population and Mean Temperature of the World

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.

ABOUT THE SPEAKER

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 ysimulación de sistemas complejos. He is academician of International Academy for Systems and Cybernetics Sciences;

Matjaz Mulej and Borut Ambrozic

10. Social Gerontology as an Applied Systems Behavior and Theory

ABSTRACT

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.

ABOUT THE SPEAKER

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 responsibility. His most recent award is HORUS platina award for 60 years of volunteering as a practice of social responsibility.
He is academician and vice president of International Academy for Systems and Cybernetics Sciences.

Matjaz Mulej and Anita Hrast

11. About the IRDO Institute for the Development of Social Responsibility (SR) as an Informal Promotion of Systemic Behavior

ABSTRACT

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.

Bernard Scott

12. Second order systems: cybernetic foundations for the social sciences

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

ABOUT THE SPEAKER

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.He is Academician of International Academy for Systems and Cybernetics Sciences.

Francisco Parra-Luna (Spanish)

Emeritus professor, Universidad Complutense de Madrid, Member of IASCYS, Vice.president of the UES, Honorary president iof SESGE, Editor of AVANCES SISTÉMICOS，
Academician of International Academy for Systems and Cybernetics Sciences.

13.T = Y / X，AS THE GREAT METAPHOR OF THE UNIVERSAL PERSONAL TRANSFORMATION

ABSTRACT

T = Y / X is the formula that encloses everything we can do as human beings, and where "Y" represents the obtaining of the best value system possible and "X" obtained with the lowest possible energy cost. No other thing is possible to imagine or be reached by the human being. Everything and all we can do in life is to get a growing "T" as long as "Y" shop to the maximum and "X" shop to the minimum.

Could we speak then of a “Social Sin” of Governmental Science (the science of social organizations) from a critical systemic perspective?. Could it be unconsciously drifting towards the analysis of what is secondary as opposed to what is relevant? Could it have forgotten too often the ultimate aim for which states and governments exist or were created?. Should not these questions be asked, not to underestimate what it has done until now, but to claim and foster what it could also undertake? Governmental Science’s hypothetical “social sin” would have two dimensions: the first concerns its socio-ethical and anti-humanistic consequences (not to see politics from the point of view of the man in the street); the second is epistemological, for its focus on partial parts of cosial systems (forgetting mainly their overall efficiency in terms of Universal Human Rights as an interrelated set). The problem is to abandon practically the final aim for which the polity was created, that is to say: 1) To increase the sum of individual global satisfactions of its needs; and 2) To reduce differences between these individual global satisfactions. But it seems that this final and only aim of the goverment does not worry too much about the established organizational Science.

Keywords: Humanistic Systems Theory, Reference Patterns of Values, Axiological approach,

Governmental/organizational efficiency, Social Sin.

14. Could a Systemic Approach Predict the Social Role of Women in the Future? : An Attempt on Socioevolutiany Bases

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 Methodoly 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 Epistemoilogy; Kowledge; Techonological development; Integrated Personalism.

5. Transportation and Accommodation Information

5.1 Hotel Information

Liaoning Hotel

Address: No.2 West Road of 4th North Ring Road

How to get to Liaoning Hotel from the airport?

When you arriving at international Beijing Capital Airport, if you cannot find the pick up volunteer, please take a taxi to Liaoning Hotel. Please show the following Chinese address of Liaoning Hotel to the taxi driver: 辽宁大厦，北四环西路甲 2 号，保福寺桥东北侧

5.2 Conference Information

Conference Venue:
N204, AMSS, CAS, No.55 Zhongguancun East Road
中关村东路 55 号中国科学院数学与系统科学研究院南楼 N204

How to get to the conference Venue
The volunteers will meet you in the Hotel lobby.

Contact Information:
In case you need help, please call the following phone numbers:
Dr.Yi HU: +86 13522802240
Dr. Yunjie Wei: +86 18800175304

6. About AMSS

The Academy of Mathematics and Systems Science (AMSS) of the Chinese Academy of Sciences (CAS), was founded in December 1998 with the integration of the Institute of Mathematics (established 1952), the Institute of Applied Mathematics (established 1979), the Institute of Systems Science (established 1979), the Institute of Computational Mathematics and Scientific/Engineering Computing (established 1995). Prof. XI Nanhua is the current president.
As a national comprehensive research center of mathematics and systems science, its mission is to conduct original and crucial research, and to cultivate leading scientists and talents, by gearing their research to the international academic frontier and national strategic demands. The goal of the AMSS is to become a world renowned center for scientific research, talent training, and scholarly exchanges in the field of mathematics and systems science; and an advisory center on national strategic issues.

Besides the four institutes, the AMSS also houses many centers and key laboratories, including the Center of Excellence in Mathematical Sciences, the National Center for Mathematics and Interdisciplinary Sciences, the Hua Loo-Keng Center for Mathematical Sciences, the Morningside Center of Mathematics, the Center for Forecasting Science, the State Key Laboratory of Scientific and Engineering Computing, the Key Laboratory of Management, Decision and Information Systems, the Key Laboratory of Systems and Control, the Key Laboratory of Mathematics Mechanization, the HUA Loo-Keng Key Laboratory of Mathematics, and the Key Laboratory of Random Complex Structures and Data. The AMSS has also set up several new interdisciplinary research centers in recent years.

Its major research fields include: analysis and mathematical physics; number theory, algebra, geometry and topology; operational research and management sciences; systems and control; probability and statistics; scientific computing; and computer mathematics. Its interdisciplinary research fields include: financial mathematics, bioinformatics, complex systems, decision making under uncertainty, complex network theory, computational materials science, and knowledge science. Its applied research fields include: engineering technology, national economy, life science, ecology and environment.

The AMSS has more than 324 staff members, including more than 242 researchers. Among them, 15 are CAS Academicians, 1 are Academicians of the Chinese Academy of Engineering and 6 Fellows of the Third World Academy of Sciences，5 academicians of International Academy of System and Cybernetics Science. The AMSS is authorized to confer advanced degrees in five primary academic disciplines and thirteen secondary discipline. Currently, it has more than 400 graduate students and about 50 post-doctoral fellows.

7. About SEM-UCAS

School of Economics and Management of UCAS, formerly known as the Management department of CAS founded in 1978, is the first school established after GUCAS (which changed her name to UCAS in 2012) adopted its present name in 2001. The Renowned economist Cheng Siwei served as the dean of the school since its establishment.

In recent years, the School of Economics and Management has always been striving to be a domestic first-class research-based management school with significant international influence.

The school is committed to acquiring a deep understanding of China’s economic development theoretically and practically, and expanding its teaching and researching fields based on their own unique features. And a comprehensive discipline system has been built with the featured courses like innovation and entrepreneurial management, and financial engineering management.