Table of Contents

Key Note Speakers

JACOBS, GARRY (CEO, WAAS, *garryjacobs@gmail.com*)

Transdisciplinary Social Theory and Integrated Thinking

The founding of the discipline of anticipation marks a major advance on the pathway toward integration and unification in the social sciences. For the principle of anticipation reconciles several critical dimensions of human existence. First, anticipation links and reunited the past, present and future by showing that all social determinations are governed by this triple time dimension. Our view and interpretation of the past has profound impact on our social construction of the present and expectations of the future. Similarly, our expectations of the future also influence and mold our interpretation of the past and present. The reconceptualization of modern history during the past three decades is illustrative. Second, anticipation reconciles the objective and subjective dimensions of reality. For while past determinations can be regarded and misconceived as purely physical in origin, the influence of the future necessarily includes the impact of our aspirations, beliefs, attitudes, perceptions, fears, etc. The unification of objective and subjective dimensions is essential to the evolution of the social sciences. Third, anticipation underlines both interdisciplinary and transdisciplinary factors in the social sciences. For it makes evident that our perceptions and aspirations from all fields of life influence both our perceptions and actions in every other field, as the prospects of war or peace, human rights, technological innovation and automation impact on such diverse fields as politics, economics, sociology and psychology. Further, anticipation compels us to examine the transdisciplinary forces and processes which underlie human behavior in very different fields and disciplines. Together these observations provide valuable insights for formulation of a unified theory of causality. Anticipation challenges the convention concept causality rooted in fragmented and partial, objective physical factors and forces that have acted in the past, thereby omitting the determinative impact of non-physical subjective social, psychological and occult factors and forces.

Garry Jacobs is an American social scientist and management consultant focusing on new paradigm concepts and solutions in the fields of economy, education, governance, international security. He is Chief Executive Officer of the World Academy of Art & Science (WAAS), co-chairs the Academy's project on new paradigm in human development and human centered economics, and is managing editor of Cadmus Journal. He is also Chairman of the Board and Chief Executive Officer of the World University Consortium (WUC) and co-chairs the project on new paradigm in higher education. Inspired by the Indian philosopher-sage Sri Aurobindo, Jacobs has worked in India since the early 1970s, where he is Vice President and Director of Social Science Research at The Mother's Service Society and co-author of a strategy to create 100 million jobs in India within 10 years. He is also professor of Transdisciplinary Social Science at Person-Centered Approach Institute, Italy and a Full Member of Club of Rome International. His business consulting experience includes assignments for large and small corporations in USA, Europe and Asia, on strategies to accelerate growth and improve profitability. He previously served as Member-Secretary of the International Commission on Peace and Food (www.icpd.org) (1989-1994).

ZUCCONI, ALBERTO (Secretary General, WUC, *alberto.zucconi@iacpedu.org*)

Agency and Resilience, Variables of an Effective People Centered Education Promoting Sustainable Governance

Many variables need to be considered and organized in synergic and intersectorial ways to create the conditions for effective and sustainable governance. Some of the variables are complexity, interconnectedness and anticipation. Nowadays humanity is caught in the Antropocene rippling waves of change, and it is most urgent to effectively protect and promote human and natural capital at every level of society.

People need to develop their innate potentialities for relating effectively with themselves, others and the world by relearning the ways to establish emotional bonding with all the life forms. Relating with empathy and respect for ourselves others and all the life forms is one of the most effective ways to develop agency and resilience, to promote

sustainable change at every level. We need to retool education because we urgently need a more effective education, one that will empower ourselves to diagnose and manage the worsening man made challenges facing us.

We need to empower people and communities, promote awareness and transparency, make explicit what it is often implicit. To foster a more transparent, resilient and congruent society, where values and lines of power differentials are visible as well as the prejudices, denials and the obsolete ways of knowing and doing.

The understanding of these processes, a sort of a compass for the resilient citizen, should be available to very stakeholder, enhancing their agency and resilience. To do so we need to offer Person Centered Education and promote People Centered projects. The Person Centered Approach is an holistic/systemic approach with ample scientific validation. When applied to the field of education is named called Student or Person Centered Education. The People Centered Approach (PCA) is a scientifically validated, interdisciplinary and intersectorial approach employed with large communities and designed to protect and promote human ecologies and natural ecosystems. PCA is a values oriented approach based on Equal Rights, deep respect of all form of life, cultures and traditions.

We need to promote a new paradigm for the identity, structure, organization and goals of the new Polis, where to create the conditions and facilitate process that will protect and promote agency, resilience, health and well being for all and, and in so doing, real prosperity.

Dr Alberto Zucconi, a clinical psychologist, president and cofounder with Carl Rogers of the Person-Centered Approach Institute (IACP), a non profit international organization, dedicated to research in human behaviour and the training of professionals with the Person Centered Approach. Dr Zucconi was a faculty member of the Western Behavioural Science Institute (WBSI) in La Jolla, CA., a member of staff at the Carl Rogers' Peace Institute. Dr Zucconi was teaching for many years at the postgraduate level Person Centered Psychotherapy and health promotion at the faculty of medicine of the University of Siena (Italy). Alberto has been working internationally for 40 years as a trainer, lecturer and consultant for public and private organizations. He is a Fellow and a Trustee of the World Academy of Art and Science and the Secretary General of the World University Consortium. Dr Zucconi has designed and directed several research projects and written several papers and books. The American Psychological Association Psychology, Division 32, gave IACP and to Alberto Zucconi the Charlotte and Karl Bühler Award for 2012, an award given to an institution, and an individual associated with an institution, that has made an outstanding and lasting contribution to humanistic psychology.

NAGAN, WINSTON (Chairman of the Board, WAAS, *nagan@law.ufl.edu*)

Social Science, Values and Intellectual Responsibility

It is widely acknowledged that the social science of social processes are engaged in a complex aspect of both observation, the recording of observation and the question of what the consequences are of the process of observation itself. The nature of social process we know is not static but incredibly dynamic. As an ancient philosopher put it, you can't jump into the same river twice. Social process is now seen as a flow of events on a time/space manifold. Events on multiple trajectories that are intricately tied to processes of change, some evolutionary and some revolutionary. The great insight of pragmatic philosophy as it connects to the social and political sciences (including law) is that law and politics are invariably a response to the problems identified and assayed by the social scientists. It is of value to both law and politics to anticipate the processes and directions of social and political change. A social science that avoids the identification of problems that emerge from the social process contexts is not very useful. The identification of problems requires special techniques that locate the problems that emerge from social process on a time/space manifold that is in fact in a state of flux. As one social scientist put it, the stable is simply a special case of the unstable. In this paper we outline the techniques of contextual mapping of the social process, indicating that problems are essentially problems about the allocation of socially desired or claimed values. The mapping targets specific phases of the social process and outlines the problems characteristic of each particular phase. The problems are therefore identified by a process of contextual mapping. These problems guide political and legal inquiry which generate the necessity for public intervention in the form of problem solving.

Professor Nagan was born in South Africa and educated at the University of Fort Hare. He later studied law at Oxford University. He graduated from Oxford University with the degrees of BA honors and MA. He continued his studies at

Duke University, LL.M, MCL. He did his doctoral studies at Yale under Myres McDougal and Michael Reisman (JSD). While at Yale, he served as President of the Policy Sciences Center. He left Yale for a position at the University of Florida where he currently is Sam T. Dell Research Scholar Professor of Law and Director of the Institute for Human Rights and Peace Center. He was elected to the Board of Directors of Amnesty International, and later elected Chair Person of the Board. Professor Nagan serves as an editor on Cadmus, the print journal of the World Academy. He is also the founder and Editor-in-Chief of Eruditio, the print journal of the World Academy. He is currently Chairman of the Board of Trustees for the World Academy of Art & Science. Professor Nagan's most recent books include: the U.N. Charter and the Application of Modern Communications Theory (2014) and Human Rights and Dynamic Humanism (2016).

PAUNOVIC, ELIZABET (Head of WHO European Centre for Environment and Health, *paunovice@who.int*)

Health and Environment in WHO European Region: Creating Resilient Communities and Supportive Environments

In the WHO European Region 16% of all deaths as well as of all burden of disease are caused by environmental factors that can be eliminated and avoided, which means that these deaths and diseases can be prevented.

In spite of these facts, environment must be recognized as not only a source of potential hazards, but also a health-promoting and health-protecting asset that can extend life, improve its quality and increase overall well-being. A comprehensive understanding of the relationship between health and the environment requires a forward-looking perspective and insight into the composite interactions among the physical, biological and social spheres.

Health 2020: The European policy for health and wellbeing recognizes that the environmental determinants of health are of equal importance for creating, maintaining and restoring health as biological, social and behavioural determinants and identifies the creation of resilient communities and supportive environments as one of the four priority areas for action in the WHO European Region. Its goal is to significantly improve the health and well-being of populations, reduce health inequalities, strengthen public health and ensure sustainable people-centred health systems that are universal, equitable, sustainable, of high quality and steered through good intersectoral governance.

WHO Regional Office for Europe supports its Member States and partners to understand and navigate this complexity and identify policies and actions in different sectors, nationally and internationally, that can benefit the environment and human health. WHO role as the science policy interface in providing the advices, methodologies and tools in creating scientifically based policy solutions and interventions is of great importance in supporting Member States to address environmental challenges to health in the 21st century.

Great opportunities for progress lie in changing consumption patterns and fostering healthy and environmentally friendly developments in energy, transport, housing, urban management and agriculture, as well as in the health sector itself. Yet, there is a need to further develop the evidence and arguments that would support these changes, as well as the guidance to address new and emerging issues, which are often characterized by a very high degree of uncertainty and complexity.

Dr Elizabet Paunovic is the head of WHO European Centre for Environment and Health. She is holding degrees from the Medical Faculty in Belgrade (Serbia) as the medical doctor, and postgraduate degree from Medical Faculty in Ljubljana (Slovenia), specialization of occupational health. Her working experience is covered by 30 years of experience in occupational and environmental health, as the main researcher in numerous projects related to occupational and environmental impacts on health. Her main areas of professional expertise and activities are related to occupational and environmental health interventions and actions aimed to prevent and reduce occupational and environmental impacts on health. She also served as the State Secretary in the Ministry of Health of Serbia. At the current position Dr Paunovic is managing WHO Centre for Environment and Health.

KINIGER-PASSIGLI, DONATO (Fragile States and Disaster Response Coordinator (ILO), *kiniger@ilo.org*)

Crisis risk management: Anticipating Change, Counteracting Fragility

The range of countries considered conflict affected or fragile is increasingly broad and diverse. At the same time recovery and peacebuilding are now better understood as long-term processes requiring a mix of immediate, medium and long term responses, rather than linear events.

Anticipating the escalation of major crises is a challenge that goes beyond the state level responsibility and has now to be implemented at community and household level with a people-centred approach.

Around 1.5 billion people live in conflict and fragile states / environments, globally. Although the root causes of fragility vary, inequality and social exclusion tend to exacerbate fragile situations.

To manage the risk and anticipate change confronting global challenges is of paramount importance in order to prevent major crisis worldwide, starting at local level (and not only in fragile contexts).

There is an urgent and growing need to improve emergency preparedness, anticipating change and adapting to it. This is particularly true in countries exposed to recurrent natural hazards and conflicts.

As funding for humanitarian assistance in fragile countries continues to decrease, it will be particularly important to invest in building capacities and strengthening governance to manage crisis risk at all levels of society (household, community, national and regional). Action is needed to tackle natural and human-made risks, reduce the scale and costs of humanitarian interventions and increase their effectiveness.

In parallel, a people-cantered approach should be nurtured helping local governance with bottom-up initiatives and supporting local people needs and aspirations. Working at community level helps reducing vulnerability to disasters and climate change as demonstrated by many successful community level infrastructure rehabilitation programmes and labour intensive investment projects.

A culture of prevention and resilience needs to be fostered at all levels through better education and inter-communal dialogue, embedding a culture of sharing, learning and testing.

Donato Kiniger-Passigli is a specialist in crisis resolution, development cooperation, and labour affairs. He is also an expert in effective negotiations and strategic communication in political contexts. Donato Kiniger-Passigli currently coordinates the Fragile States and Disaster Response Group at the International Labour Office (ILO). He is in charge of promoting and organizing ILO crisis response programmes and initiatives in the wake of major humanitarian crises, addressing unemployment and decent work deficits. He led ILO's delegation to the World Conference on Disaster Risk Reduction in Sendai in 2015 and was member of the UN senior management group that prepared the ensuing UN Action Plan. He also prepared the proposal - now before the International Labour Conference - for an ILO normative standard dealing with employment, decent work, peace and resilience. He authored several publications on emergency management, risk assessment and coordination. In one of his recent publications, he devised a diagnostic and programming tool to orient employment and Decent Work generation in fragile settings. He is member of the advisory board of the Geneva Peacebuilding Platform and in 2015 he became a Fellow to the prestigious World Academy of Art and Science (WAAS). As an expert in conflict analysis, risk management, disaster needs assessment and business continuity, he delivers lectures and trainings on the above subjects.

MILLER, RIEL (Paris, UNESCO Headquarter, *r.miller@unesco.org*)

The UNESCO Chairs in Anticipatory Systems and the Role of Futures Literacy

UNESCO's Futures Literacy Laboratories (FLL) provide initial evidence that all around the world people use anticipatory systems and processes to sense and make-sense of the world. FLL are action-research/action-learning collective intelligence processes that use the future to create knowledge. The forthcoming publication, Transforming the Future:

Anticipation in the 21st Century, presents the results of some 30 FLL initiated by UNESCO and implemented in close collaboration with partners on the ground in all parts of the world. The book offers proof-of-concept confirmation of the relevance of terms like Futures Literacy (FL), as a capacity to use the future in more advance ways, and the Discipline of Anticipation (DoA), as a theoretical framework for distinguishing different anticipatory systems and processes.

The results presented in Transforming the Future also reinforce the suspicion, without providing conclusive evidence, that the DoA offers a critical theoretical underpinning to the capacity to both actively use the future in real-time as well as to design processes that use the future in more reflective and deliberative ways. The impact of the DoA on how the future is used arises from its role in structuring such activities on the basis of an initial differentiation of anticipatory systems and processes into closed (contingent/preparatory and optimization/planning) and open (novelty/emergence). Starting conscious human efforts to use the future with an awareness that there are different reasons and methods for imagining the later-than-now from closed and open perspectives appears to significantly enhance the fitness for purpose of the anticipatory systems and processes selected to conduct the particular task that uses the future.

Finally, for the purposes of this session, the results discussed in Transforming the Future also offer tantalizing hints that may support three other hypotheses. One is that there is a set of principles that can be distilled to help guide the design of processes that use the future to perceive and invent novelty, where novelty is understood as "ontological expansion" (I. Tuomi) relative to the originating sources of information. Two is that by understanding how to seek "ontological expansion" enhances human agency as an effort to take advantage of both endogenous and exogenous changes of all kinds. And three, if there is a way to be more systematic and efficient in connecting human agency to "ontological expansion" there is the prospect of shifting the balance of humanity's strategy for resilience away from insurance/planning towards diversification/experimentation.

The research agenda remains large and daunting. One practical next step being pursued by UNESCO is to conduct research through "prototyping" FLL, with the aim of developing, testing and diffusing design principles and expertise that advance Futures Literacy worldwide. Such a research phase would also hopefully shed light on the various hypotheses about the implications of FL, the DoA and human agency.

For over thirty years Riel has been co-creating innovation and transformation in both the public and private sectors around the world. He is one of the world's leading designers and practitioners of processes that use the future to both sense and make sense of complexity. He has worked as a senior manager in the Ontario public service (Ministries of Finance; Universities; and Industry) and for some thirteen years in total at the OECD in Paris (Directorates of: Economics; Science & Technology; Education; Territorial Development; Development Centre; International Futures Programme). In 2005 he founded an independent consultancy – xperidox (which means knowledge through experience) to advise clients on how to use the future more effectively. In 2012 he was appointed Head of Foresight at UNESCO. He is currently working on a forthcoming official UNESCO publication entitled: Transforming the Future: Anticipation in the 21st Century. Riel is an experienced keynote speaker, project manager, master of ceremonies, university lecturer, workshop leader, and group facilitator. He is widely published, with works that cover topics such as the future of: innovation, research, money-finance, public services, education, the Internet, identity, information technology, the knowledge society, regional development, health, universities, telepresence, etc. Riel has served as a board member of the Association of Professional Futurists and the World Futures Studies Federation. For six years he was a Faculty Member in The Master of Public Affairs at Sciences-Po, Paris, France.

WILENIUS, MARKKU (UNESCO Chair, University of Turku, Finland, *markku.wilenius@utu.fi*)

Understanding Economic and Social Macro-Waves

In current field of futures studies, one of the major questions to understand today's complex and troublesome world is to ask are we able to define some patterns through which the dynamics of the global system would become more understandable for us. Furthermore, the key question lies what types of anticipatory power this kind of pattern recognition could deliver to as regards the future development of the global system. Anticipation, as a theoretical framework, refers to the many ways in which future, as a concept and a dimension in our mental maps, is used for

making informed decisions in the present. In my presentation I will introduce the long-term socio-economic cycle framework, known as the Kondratieff wave theory, as a central anticipatory tool for understanding large-scale socio-economic change. I will present the K-waves theory in brief, focusing especially on the implications of the systemic re-organisation for the social practices in each new wave. I then continue on to utilise the K-waves framework for anticipating the drivers for the next, sixth Kondratieff wave, which is now emerging. I will then discuss the implications of K-wave approach to futures studies and particularly to the theories of anticipation. I will conclude by implying that long-wave framework will enable us to advance in creating new, futures studies based methodologies what I like to call reflexive foresight.

Markku Wilenius is professor of futures studies in Turku University Business School. He is also Unesco Chair in Learning Society and Futures of Education. He has worked over 20 years with futures studies. In 2015 he co-founded Turku Complex Systems Institute at the University of Turku. In recent years his research interest include understanding socio-economic long-term waves, future of financial industry, future of forest industry and future of non-hierarchical organizations. His latest project is the future of cities and communities. He is the president of three foundations. He has also worked with Allianz, world largest private insurer, leading their strategic research and development. He is a member of Club of Rome and has led Finnish delegation in Johannesburg Sustainable Development Summit. He has published books and articles widely. His forthcoming book is called “Patterns of the Future. Understanding the Next 40 Years of Global Change” (World Scientific, London).

POLI, ROBERTO (UNESCO Chair in Anticipatory Systems, University of Trento, *roberto.poli@unitn.it*)

Pragmatic Utopias

After recalling the difference between forecast, foresight and anticipation, I shall raise the question about how do we choose among different futures. The paper shows that selection of preferable futures according to criteria such as those based on evidence-based assessments tend to be structurally flawed. Things become even worse as soon as one realizes that most new forms of innovation and value production are badly detectable or even invisible to existing economic indicators and policy instruments. Both frames tend to see the future as something already given, a set of already pre-established options from which one has to pick up her preferred option. In order to develop the alternative vision of the future as modifying and eventually expanding our capacity to act I come back to the customarily misunderstood idea of utopia. According to contemporary literature on utopia, utopias are processes not end-points; they do not aim at perfection – but at difference, at the ability to arrange society differently. Their purpose is to open up the mind to new ways of interacting with others, of allowing ourselves to be surprised by a world that does not promise ‘more of the same’. I shall end by showing how utopias can work as motivating engines within social practice.

Roberto Poli has been awarded the first UNESCO Chair in Anticipatory Systems (http://www.projectanticipation.org), is fellow of WAAS—World Academy of Art and Science and STIAS—Stellenbosch Institute for Advanced Study. He coordinates the research unit eVita—Età della vita (Ages of life) and is Director of the master in “Previsione sociale” (Social Foresight) at the Department of Sociology and Social Research. Poli is Editor-in-chief of Axiomathes (Springer), and editor of the series Categories (De Gruyter); he is member of the editorial board of five journals, including Futures and the European Journal of Futures Research. Poli has published five books, edited or co-edited more than 20 books or journal’s special issues and published more than 200 scientific papers.

CONSTANTINESCU, EMIL (President of Romania 1996 – 2000, *cabinet_ec@constantinescu.ro*)

Managing uncertainty – a challenge for the nowadays society

The certainty - uncertainty binomial expressed across history the contradictory human nature and its struggles. Totalitarian systems have exaggerated the value of certainty. Dictators have gained power by promising safety and have remained in power in the name of law and order, while revolutions broke out where immobility became unbearable for the human need for change. Although uncertainty may prove difficult to eliminate or to rule, it should not be demonized. The best option would be to manage it in an acceptable manner, but for doing this one must first understand it.

In terms of both science and art, uncertainty can get a double valence: it is either a catalyst for scientific research and artistic performance or a real danger in promoting authentic values. The difficulty of separating these two perspectives is the great challenge for the contemporary society.

The essential difference between political systems is given by the way they manage uncertainty. Do these systems acknowledge uncertainty and try to find solutions through dialogue? Or they try to eliminate uncertainty through the dictate of religions or ideologies?

Democratic culture does not deny uncertainty. It helps us ask questions and use dialogue to support human progress. Democratic institutions are founded on the idea that there is no absolute truth and no single answer to every problem. The management of uncertainty is fundamentally related to the essence of life in an open society. Unlike totalitarian regimes that demonize it, democracy can turn uncertainty into progress. This progress is defined by the human aspiration to freedom, solidarity, respect and tolerance. Only dialogue, and not force, could help us manage uncertainty. Faced with uncertainty, risk would be reduced by diversity rather than by uniformity. Calls for ethnic or religious purity are creating major risks, rather than reducing them. The restauration of a relative balance between uncertainty and certainty can only come from open education based on fundamental human values.

Prof. Dr. Emil Constantinescu, trustee WAAS, is a Romanian scientist, Professor of Geology and civic activist, who served as the third President of Romania, 1996 - 2000. Emil Constantinescu is the current President of the Romanian Foundation for Democracy, Honorary President of the University of Bucharest Senate and President of Academy for Cultural Diplomacy, Berlin. Member in the World Justice Project Board of Directors, USA and a member in the Juries awarding the prizes: Havel, Oslo; Walesa, Gdansk; Coudenhove-Kalergi, Vienna. Former President of University of Bucharest and President of National Council of Universities Romania, 1992-1996.

For his activity in the democratic reforms, enforcing the rule of law and global peace, Prof. Emil Constantinescu received numerous international distinctions, among: *Aristide Calvani Prize* for Peace, Democracy and Human Development – Paris, 1997; *European Statesman of the Year*, East West Institute – New York, 1998; *European Prize*, Coudenhove-Kalergi Foundation, for his role as actor of building Europe and stability in Central and Eastern Europe – Vienna, 1998; *American Bar Association Prize* for exceptional achievements in promoting the rule of law – Atlanta, 1999; *Ambroise Vollard Prize* for the education of professional and moral elites – Madrid, 2011; *Gusi Peace Prize*, the most important prize awarded in Asia – Manila, 2013; *Lifetime Achievements Award* – Berlin, 2013.

Doctor Honoris Causa of Ecole Normale Superieure Paris; Universities of Liege, Montreal, Athens, Beijing, New Delhi, Bangkok, Maribor, Bilkent Ankara, Saint Kliment Ohridski Sofia etc.

Abstracts by First Authors

A

ALVAREZ-PEREIRA, CARLOS (President, Innaxis Research Institute, Spain, *calvarez@innaxis.org*)

The interplay between Science and Technology: in urgent need of complex anticipatory systems

Alarms have been raised since a long time about the systemic challenges that humankind is facing. In this context, it is taken for granted that Science and Technology (S&T) are key to find solutions to those dramatic challenges. This is a strong paradox, since S&T have been not only central elements of the development model followed by human societies, but often (and still today) very effective instruments of mass destruction, environmental degradation and social exclusion. This paradox is grounded in some implicit assumptions, namely that the evolution of human societies is driven by technological change and that S&T are essentially beneficial and neutral with respect to their applications, which depend on human decisions. But it can be argued that the processes and rules through which scientific discoveries and technological innovations are produced are not neutral, but rather reflect a particular organization of society and therefore embody certain values and interests. So, we cannot take for granted that S&T will drive our course away from socio-ecological disasters. On the contrary, they could pave the way to "technolitarian futures" in which human and environmental purposes will be secondary to the fulfillment of the logic of technological innovation.

Overcoming this situation requires a different conceptual framework in which could be integrated the complexity of the processes, rules and motivations driving S&T as they are practiced today. Anticipatory innovation processes need to be set in place which enable S&T to address fully the complex challenges of our societies.

Key words: Science and Technology, Complexity, Sustainability, Social Exclusion, Technological Innovation, Technolitarian Futures, Anticipation, Disruption, Societal Transformation

---

B

BARELLI, ELEONORA (Department of Physics and Astronomy, University of Bologna, *eleonora.barelli@studio.unibo.it*)

BRANCHETTI, LAURA (Liceo Statale "G. M. Colombini", Piacenza, Italy, *branchetti.laura@gmail.com*)

LEVRINI, OLIVIA (Department of Physics and Astronomy, University of Bologna, *olivia.levrini2@unibo.it*)

TASQUIER, GIULIA (Department of Physics and Astronomy, University of Bologna, *giulia.tasquier@gmail.com)*

The design of future- and present-oriented teaching modules on the science of complex systems for upper secondary school students

Many researches and reports highlight that the young generation have difficulties in projecting themselves into the future, and in developing scope as future professionals. Whilst the past generations looked at science and technology as positive possibilities for addressing societal challenges, now the young generation perceive them as sources of fears and unmanageable uncertainty. How can scientific knowledge help the youth to develop skills for enabling them to rationally and emotionally manage their future?

In this talk we address the hypothesis of if and how scientific knowledge, particularly the science of complex systems, can make students develop hard skills and if such skills can be turned into soft-transversal ones. The science of

complex systems was chosen because it is intrinsically full of concepts, like feedback and self-organization, which are often used both as common use words in the everyday language and as metaphors of social behaviour.

In order to explore our hypothesis, we designed three sets of specific activities that respectively aim to: i) develop hard-scientific knowledge; ii) turn hard-scientific knowledge into hard skills; iii) turn hard skills into specific soft-transversal skills that we identify as future-scaffolding skills. The first set of activities consists of lessons in which the concepts of feedback, self-organization, emergent properties, as well as the characteristics of the process of modelling and of the different spatiotemporal scales, were interactively taught. The second set consists of the presentation of simulations, as one of the main tools of science for studying the evolution of a system, in the execution of laboratory experiences that pointed out the role of modelling in climate science and led them toward the interpretation of graphs. The last set of activities consists of the guided construction of a logic cause-effect map about a problem related to climate change, in the identification of feedback cycles within a complex problem as a component of the possible evolution of the system. At the end of these activities, we presented an urban problem and asked the participants to discuss about it in term of probable, possible and preferable futures, writing scenarios and designing an action to do in the present in order to realize the desired future. Looking at the way they decided to face the problem and to play with possibilities, we checked the validity of our hypothesis.

All the mentioned activities were carried out within a teaching laboratory-course about the topic of climate change addressed in its many dimensions, targeted to secondary school students (17-18 years old, grade 12-13). In the talk, we will present the activities as well as the pilot study we carried out to test our conjecture.

Keywords: scientific knowledge, hard skills, soft-transversal skills, feedback activities, future activities

---

BENATI, STEFANO (Department of Sociology, University of Trento, *stefano.benati@unitn.it*)

Anticipatory Scenarios and Optimal Decision Making

Anticipation is a set of techniques and processes aimed at building an idea of future. The typical result of a work of anticipation is building a set of scenarios, of which the social actor (managers, private or public administrations, and so on), must be conscious. The construction of scenarios has value in itself, as it prepares the decision maker to events that somehow had expected, thus improving (hopefully) the company's resilience to external shocks. However, there are operational contexts in which scenario building is preliminary to real operational decisions. These decisions can be very complex and interdependent between them: For example, suppose one has to decide the opening, closing, or dimensioning of health centers within 5 to 10 years. Those decisions implies operational costs that are constraints to any resilience or anticipatory consideration. The anticipation disciplines must dialogue with other scientific methods, decision theory and operational research, which already traditionally use the construction of scenarios in their operative methodologies.

In this communication, we show how future scenarios are traditionally used for optimal decision making in operations research, and we will claim that minimum regret models are the most appropriate to embed the anticipatory constraints provided by future experts.

BONESINI, ALESSANDRO (Director of Italian Schools and Education Office, Italian General Consulate in Frankfurt am Main - Germany, *alessandro.bonesini@gmail.com*)

BARATTER, PAOLA (School Head – Istituto Comprensivo Ala, Trento, *paola.baratter@scuole.provincia.tn.it*)

BRUNORI, FRANCESCO (-skopìa Anticipation Services®, *francesco.brunori@skopia.it*)

CRISTOFORETTI, LAURA (School Head – Istituto Comprensivo Avio, Trento, *cristoforetti.laura@gmail.com*)

SCOLOZZI, ROCCO (-skopìa Anticipation Services®, rocco.scolozzi@skopia.it)

System thinking about the commons: reflections and research action about agency and care for landscape resources in two Italian middle schools

Approaches and activities adapted from Teach the Future (teachthefuture.org) and System thinking tools (Creative Learning Exchange, clexchange.org) were developed and tailored for a one-year pilot project with children aged 13–14 (third year of Italian middle school). The project is still on going and expected to end with the current school year.

Although such aspects are well explored issues in scientific literature and increasingly adopted in education, in Italy they are still new and innovative. Their adaptation for middle school in two small alpine communities and the collaboration between educators and the school teachers entailed an added value.

The ambitious objective was two folded:

- in terms of pedagogy: introducing elements of futures literacy and system thinking in the Italian schools;
- in terms of specific expected site-based results: increasing awareness about the future of commons and the required citizens' responsibility to maintain them.

System thinking explores the interdependencies among the elements of a system, looking for patterns rather than memorizing isolated facts; it focuses on the feedback loop structure of a system because that structure determines the system's behaviour over time. System thinking concepts and skills helped the student to making explicit future-oriented reflection about the collective goods existing in their living context, such as pastures, woodlands, freshwater and landscape beauty.

By means of strategic interviews, field work and observations, interdisciplinary and interactive activities, the students have acquired awareness about simple variables and recurrent structures in dynamics of "their" commons.

The project confirms the synergy between future-oriented pedagogies and system thinking, both providing benefits for other teaching disciplines; together such perspectives can help nurturing pro-active citizenship, aware of complexity in the common resource management.

BROWN, KERRY (Edith Cowan University, Perth, Australia, *k.brown@ecu.edu.au)*

WATERHOUSE, JENNY (University of Newcastle, Newcastle, Australia, *jennifer.waterhouse@newcastle.edu.au*)

KEAST, ROBYN (Southern Cross University, Gold Coast, Australia, *robyn.keast@scu.edu.au)*

ALTIMIRA VEGA, RICARDO (Polytechnical University of Madrid, UPM, Madrid, *ricaltimiravega@gmail.com)*

Anticipation and Decision-making in International Negotiation Simulations

This paper outlines and discusses the concept of anticipation through an overarching framework of decision-making and action in negotiation based on Waterhouse, Keast and Brown's (2011) arena approach and Altimira, Kauffman's (2008) Gender approach.

The research focusses on the orientation toward anticipation in international negotiation simulations when the topic is of high currency and also complex, with a long term orientation and is of the character of a 'wicked' or intractable problem. The motivation of the research initiative is to investigate how anticipation may be built into and adapted in climate change negotiation simulations undertaken in a global context.

Further, the paper examines the patterns of interaction in the negotiation processes within these multiple arena settings to determine the way a diverse negotiation team deals with anticipation across complicated, multi-layered

arrangements. A clustering model anticipating individual, network and macro-contextual levels is also drawn upon to support an analysis of competing values, attitudes and power relations in a multi-party setting (Brown et al 2010).

C

CAIATI, GIOVANNI (Knowledge and Innovation – K&I, Roma, *giovanni.caiati@gmail.com*)

QUINTI, GABRIELE (Knowledge and Innovation – K&I, Roma, *gabriele.quinti@gmail.com*)

Energy transition, anticipation and change. A study on the anticipatory experiences of the low carbon society

A paradigm shift toward the so called low-carbon society is one of the main challenges that our societies have to face in the next future. In the framework of the European Commission 7th Framework Program research project MILESECURE-2050, an empirical research was carried out to understand the social dynamics that may characterize this change in the future. The research consisted in a Europe-wide study into communities that "anticipate" at the local level some basic features of a future low-carbon society, i.e. Anticipatory Experiences. The research analyzed over 90 Anticipatory Experiences in 19 European countries. Some of the analyzed experiences attempted to change a single aspect of their communities such as developing sustainable transport, energy efficient housing, or the generation of property-level renewable energy. Others wanted to produce a holistic sustainable community that incorporated a fully functional and independent low-energy network. In synthesis, all the Anticipatory Experiences developed, or are actively developing, sustainable ways of producing, consuming and transporting energy. The Anticipatory Experiences were found to be operating at different local scales ranging from neighborhoods and towns to major cities. Their anticipatory character may be defined as the ability to take decisions and develop practical solutions today, in order to resolve issues that the society in general, and the local community in particular, will have to confront in the near future, first of all those of climate change and the depletion of "carbon" energy resources. This ability was referred as "anticipatory awareness". Taking the floor from the empirical evidence of the research, the paper investigates how the anticipatory feature of these communities turned out in a structural change both in the energy system and in the local social system, and in radical change of individual behaviors.

CASALI BAHIA, SAULO JOSÉ (Federal University of Bahia – UFBA, *saulocasalibahia@uol.com.br*)

Values and Anticipation for the Elderly and Migrants

The presentation aims to relate the *Theory of Anticipation* with some recent ideas from the discipline *Law & Economics*, as tools to solve problems which concern the elderly and the migrants.

The *Anticipation* is understood as the use of the *Foresight* (analytic exploration of possible futures, via scenarios) to action (elaboration of strategy), or the transformation of models into strategy and decision. While the *Forecast* is past-oriented and the *Foresight* is future-oriented, the *Anticipation* is present-oriented. *Anticipation* must be necessarily a normative theory, because it aims to determine and to influence the present behavior of the individuals, using the *Foresight* - from the present to the future - to establish and indicate conducts from the future to the present. This result will be created by all the social institutions availab le, including Law.

From the field of *Law & Economics* the exposition will employ the Posner's *Signaling Theory of Social Norms*, theMac Adams's *Esteem Theory*, and even Dubner & Levitt studies, whom deals with the ideas of the bad and good men and cooperation, and the costs of the signals interfering with individual behaviors. The modern *Theory of L & E* also refers to a*descriptive perspective*, whom deals with the practical consequences of the legal rules or decisions, and to a *normative* or*pragmatic perspective* also, when it will be studied what decision or abstract rule need to be adopted, in a value-scale approach.

With the perspective of *Anticipation*, the presentation will discuss how the social dysfunction of the social models for the elderly and migrants contributes to aggravate and to degenerate inter-generational relationships. Then, the

assumption of the values of the signals will be essential to develop a less dysfunctional community with higher level of resilience, trust and tolerance. So, in a *normative approach* about elderly and migrants, it will be initially necessary to create a shared vision of the problem between all the participants agents; and after to stress the significant conflicts, and to prepare public and legal policies to develop the identity of the agents and establish the communication structures between them. So, the desired behavior is basically *stimulus-driven*.

The presentation will conclude that when we anticipate matters and solutions about elderly and migration, it changes the present. *Solidarity*, *Multiculturalism*, *Identity*, *Tolerance*,*Law induction*, *Trust*, *Resilience* and *Cooperation* regarding the elderly and the migrants will be discussed at the presentation. Managing uncertainty is about learning to manage the feelings and values that the society have about itself and to understand its complexity.

CAVATORTA, LILIANA (Osservatorio Reputational and Emerging Risk, UnipolSai, Bologna, Italy, *liliana.cavatorta@unipolsai.it*)

ROSSO, GIANLUCA (Osservatorio Reputational and Emerging Risk, UnipolSai, Bologna, Italy, *gianluca.rosso@unipolsai.it*)

Managing Emerging Risks in strategic scenarios of uncertainty and complexity: A Theoretical Framework.

In a context of accelerated change and interlinked systems we are facing the challenge to build a strategic planning that can be resilient in different future scenarios, in order to be prepared for emerging risks and opportunities. In this work we study an approach to manage emerging risks and opportunities for strategic purposes in conditions of uncertainty and complexity.

Frequently a classic risk management approach for assessment cannot be sufficient because probability models could be unsuccessful. It is necessary to recognize the uncertainty and complexity in emerging risks and to address both with suitable methodologies that allow a holistic view.

Emerging risks that involve complex systems and entangled cause-and-effect relationships require adequate methodologies that allow the assessment of the degree of exposure to risks and a holistic and integrated vision. In order to avoid a compartmental view and see the global picture, we need to overcome the focus on single parts. It's necessary to evolve from bi-dimensional to tri-dimensional models introducing the concept of interconnections between each bi-dimensional structure. As we are exposed to risks with insufficient knowledge or imprecise data, a fuzzy approach can be useful. In our study we explore the combination of fuzzy logic with other models such as Decision Trees and Artificial Neural Networks to propose a possible theoretical framework.

CEPNI, ELIF (Bahcesehir University, Istanbul, *elif.cepni@bau.edu.tr*)

Unrealistic or Realistic Reality, the Use of Complexity Theory in Decision Making

The main aim of this paper is to discuss the main contributions of systems view of thinking, complexity theory, chaos theory and prospect theory to scientific method and to show why we need a novel thinking in strategic foresight process of corporates.

Studies have shown that, given a choice, people will opt for a definite electric shock now rather than the risk of a possible electric shock at some unknown time later. It seems that it's the not knowing that gets to us. "It's known as ambiguity aversion," "People are much happier with known risks". Redefining the nature of business, reinventing organizations could be a new school of management theory.

Management theories (scientific, administrative and behavioral management), most of the organizations and business schools equip leaders to operate in ordered domains which are named simple and complicated. In complex and chaotic domains leaders need different tools to guide corporates.

The fundamental gap between the success of knowledge acquisition in the natural sciences versus the rather minimal successes in understanding the dynamics of the social realm is the inherent nonlinearity, instability, and uncertainty of social systems behavior.

This is another attempt to show that we need a reconsideration of the relevance of the certainty and stability of the Newtonian paradigm to all natural and social phenomena. We may show that corporates are surrounded with discontinuous and revolutionary breaks (paradigm shifts). How the use of scenarios by relying on EPISTLE (Economic, Political, Institutional, Sociological, Technological, Legal and Environmental) analysis can improve the success of strategic plans of companies will be discussed.

How the involvement of long term multiple goals, diversification, counterfactual reasoning, the systems view of thinking , inbound and outbound changes analysis can improve the decision making process and decrease the vulnerability of companies to external shocks is the main aim.

CORAZZA, GIOVANNI EMANUELE (University of Bologna – Marconi Institute for Creativity, Bologna, *giovanni.corazza@unibo.it*)

Creativity and Anticipation: Intertwined and Non-Obvious Relationships

Anticipation of the future and projection of the evolving reality onto our expectations are fundamental mechanisms to explain how our brains and minds work (Seligman et al., 2013). Anticipation includes and subsumes forecast and foresight, adding an element of action in the present dependent on possible futures. Further, anticipation foresees reality as a complex system, where discontinuities play a crucial role in defying simple extrapolations of present trends (Poli, 2017). According to a recent definition for creativity (Corazza, 2016), the creative process should also be studied as a dynamic system, whereby originality and effectiveness are potentially in place. When the potential is realized, according to the judgment of estimators, an episode of creative achievement is materialized, whereas in the opposite case we are in the presence of creative inconclusiveness. Clearly, when originality is very significant discontinuities with respect to the status quo ante can take place, for example in the form of paradigm shifts, or of new products which disrupt the market.

Even from the short descriptions above, a form of relationship between creativity and anticipation starts to emerge: the two concepts are clearly intertwined, but far from being identical. The purpose of this contribution is to start shedding some light on similarities and differences between these two fundamental constructs. Also, we intend to address the basic question: “Does anticipatory behavior always favor creativity, or can it also introduce blocks?” The answer is a non-obvious one.

As a first example, consider the estimation of the originality and effectiveness of a new idea generated as the outcome of a creative process. According to the pragmatic approach advocated in (Corazza, 2016), no expert can posit its absolute capacity to perform such an estimation. Indeed, the history of science, art, and technology is ripe with examples of major experts who were unable to see the value of new paradigms, which later disrupted their field. Therefore, the correct attitude of the estimator is that of trying to humbly conceive diversified possible consequences of a new idea, as projected onto multiple possible scenarios. In short, foresight is necessary to evaluate a creative idea, and anticipation is required in order to bring the idea into reality. This example is therefore a positive case of anticipation that works in favor of creative achievement.

On the other hand, consider the fact that every truly original idea is faced with resistance from experts in the field: the higher the originality, the stronger the resistance. Clearly, anticipating all scenarios of critiques against the idea, the possible associated failures, or simply imagining the amount of work that will be required to bring the idea into reality, can put to a serious test the persistence and self-efficacy of the creator. Indeed, many potentially disruptive ideas do not see the light because the above anticipated burdens overcome the perceived possible benefits. From this point of view, extensive anticipatory behavior could work as a block to the fluency of a creative thinker: in fact, successful creators associated with disruptions in our cumulative culture were the ones who dared believing in their intuition without worrying too much about the future reactions of the world.

Corazza, G.E. (2016). Potential originality and effectiveness: The dynamic definition of creativity, *Creativity Research Journal*. *28*(3), 258–267.
Poli, R. (2017). Introducing Anticipation. *Handbook of Anticipation*, to be published.
Seligman, M. E., Railton, P., Baumeister, R. F., & Sripada, C. (2013). Navigating into the future or driven by the past. *Perspectives on Psychological Science*, *8*(2), 119-141.

D

DE GIACOMO, PIERO (Department of Neurological and Psychiatric Sciences, University of Bari, *piero.degiacomo@tin.it*)

FIORINI, RODOLFO A. (Politecnico di Milano University, *rodolfo.fiorini@polimi.it*)

Effective Logical Competence for People Centered Education and Creativity

In every discourse, whether of the mind conversing with its own thoughts, or of the individual in his intercourse with others, there is an assumed or expressed limit within which the subjects of its operation are confined. According to Piaget, human adults normally know how to use properly classical propositional logic. Piaget also showed that the integration of algebraic composition and relational ordering in formal logic is realized via the mathematical Klein group structure. In the last fifty years, many experiments made by psychologists of reasoning have often shown most adults commit logical fallacies in propositional inferences. Relying on many empirical evidences, they concluded that Piaget's claim was wrong. According to experimental psychologists, Piaget was overestimating the logical capacities of average human adults. The Klein group structure generates squares of opposition, and an important component of human rationality resides in the diagram of the squares of opposition, as formal articulations of logical dependence between connectives. But the formal rationality provided by the squares is not spontaneous and therefore, should not be easy to learn for adults. This is the main reason why we need reliable and effective training tools to achieve full logic proficiency and competence, like the Elementary Pragmatic Model (EPM). EPM was developed in the late 1960s following Gregory Bateson's constructivist participant observer approach. Later it was applied to develop interactive psychotherapy strategies, online counseling and E-therapy. Since the new millennium application areas have been extended even to engineering problems like user modeling, constraint requirements elicitation, software system development, etc. EPM extension as "Evolutive Elementary Pragmatic Model" (E^2PM) represents the latest contribution to current EPM modeling and simulation, offering an example of new forms of evolutive behavior by inter- and trans-disciplinarity modeling (e.g. strategic foresight, uncertainty management, embracing the unknown, creativity, etc.) for the children of the Anthropocene.

DOMINICI, PIERO (Department of Political Science, University of Perugia, *piero.dominici@unipg.it*)

Rethinking Education… beyond the «False Dichotomies»: the Hypercomplex Society and the urgency of a systemic approach to complexity*

Nowadays, as never before, t*echnology has come to participate in the synthesis of new values and of new evaluation criteria.* Technological innovation enable the social actors to perform further – and irreversible – improvements, reaching higher and higher levels of quality. This paper, therefore, has the following objectives: a) to define the limits of this *Hypercomplex* (and *Interconnected*) *Society* by analysing its risks and implications; b) to highlight the urgency of a systemic approach to complexity and of *rethinking education/formation…*beyond «false dichotomies» (education <-> new asymmetries and inequalities). On the other hand, the current ecosystem of communication is causing radical changes in codes, cultures, and in the hierarchical procedures of production and sharing (disintermediation) – an authentic *anthropological metamorphosis* – characterized by numerous implications as to paradigm, citizenship and inclusion, all of which heavily influence identity and subjectivity. The risk of such an enormous metamorphosis, implying manifold variables and concauses, has turned out not to be a unique occasion of innovation and social change, but rather a further opportunity in favour of elites and exclusive social groups. Thus*, this hypertechnological civilization needs, not only a renewed concern about rules and rights, but above all a systemic approach to complexity (rethinking education), putting into close contact knowledge and skills, too often kept far apart.* The interconnected

economy requires strategic choices as well as a new ethical attention with regard to the social actors' problems, to the system of relations and to the importance of knowledge. It follows that a new communication culture is needed, which would be open to sharing and understanding, capable of influencing the social mechanisms in developing and favouring trust and cooperation. On the other hand, communication has more and more necessity to recompose a global context which seems to be fragmented and chaotic.

F

FANZINI, DANIELE (Department of architecture, built environment and construction engineering, Politecnico di Milano, *daniele.fanzini@polimi.it*)

ROTARU, IRINA (Department of architecture, built environment and construction engineering, Politecnico di Milano, *inarot@gmail.com*)

Anticipation in Built Environment Design & Management

This contribution illustrates some possible applications of futures studies - more specifically of the anticipative processes - in the design and management of built environment, in relation with other contemporary issues like sustainable development, strategic planning, resilience and creativity.

In the built environment field, the association of project with anticipation leads to the exploration of possible futures, while taking into consideration the unpredictability of potential future events (novelty). By fixing a course, it is possible to measure probable variations and intervene so that to comply with or correct them. In this sense, a project following the principles of anticipation would be more resilient and therefore better suited to deal with the complexities of the current operating conditions. The visioning process and the extensive participation of the stakeholders emerge as alternative practices to the traditional planning methods, providing a way to effectively and efficiently manage the transformation of an area, or at least to attempt to give direction.

The first part of the presentation will report on some questions of method, allowing the association of the project practices to those of anticipation, while focusing on the sustainability and resilience of urban contexts.

The second part of the presentation will outline some examples of anticipatory approaches in the design and management of cities and territories, ranging from the first cases where anticipation was essentially applied in a rather informal way (without necessarily being coined as such) to the more recent ones, in which it was recognized as an urban development tool that supported the progressive democratisation of the urban governance.

FIORINI, RODOLFO A. (Politecnico di Milano University, *rodolfo.fiorini@polimi.it*)

A Strategic Proposal for the New Society: Surviving and Flourishing from Chaos

Current social problems are multiscale-order deficiencies, which cannot be fixed by the traditional hierarchical approach alone, by doing what we do better or more intensely, but rather by changing the way we do. As the experiences in the latest fifty years showed, unpredictable changes can be very disorienting at enterprise level. In a continuously changing operational environment, even if operational parameters cannot be closely pre-defined at system planning and design level, we need to be able to plan and to design self-organizing, self-regulating and self-adapting system quite easily anyway. Attempts to optimize hierarchical systems in the traditional top-down way will be less and less effective, and cannot be done in real time. In fact, current human made application and system can be quite fragile to unexpected perturbation because Statistics by itself can fool you, unfortunately. What Nassim Taleb has identified and calls "antifragility" is that category of things that not only gain from chaos but need it in order to survive and flourish and proposes that systems be built in an antifragility manner. The resilient resists shocks and stays the same; the antifragility gets better and better. To face the problem of social multiscale ontological uncertainty

management we need application resilience and antifragility at system level first. No anticipation, no learning and no antifragility. With antifragility system homeostatic operating equilibria can emerge out of a self-organizing landscape of self-structuring attractor points. The present contribution offers an innovative and original solution proposal to the problem of social multiscale ontological uncertainty management. Due to its intrinsic self-scaling properties, this system approach can be applied at any system scale: from single quantum system to full system governance strategic assessment policies and beyond. The reason for this is the postulate that society is an arbitrary complex multiscale system of purposive actors within continuous change.

G

GORDILHO, HERON JOSÉ DE SANTANA (Associated Professor at the Universidade Federal da Bahía and Universidade Católica de Salvador, *herongordilho@outlook.com*)

Stare Decisis and Animal Cruelty in Brazil

The presentation aims to relate the *Theory of Anticipation* with an analyze of the *stare decisis* in Brazil and identify how the *ratio decidendi* of the Brazilian Supreme Court decisions in abstract constitutionality control can create biding precedents. Anticipation, a future-based information acting in the present situation, is a model of future development of a system, allowing to realise development in a *positive* or *negative* way and try to modify its trajectory. According to Justice Luis Barroso, in several decisions in abstract constitutionality control the Brazilian Supreme Court has adopted the *stare decisis* doctrine, extending the objective and subjective limits of Its decisions. The introduction of *stare decisis* doctrine in Brasil, and Its hypotheses of overruling and distinguishing, can ensures stability and uniformity to Its judicial system. Well known in Brazil as "Theory of the transcendence of the determining motives, It invalidates any administrative or judicial decision that violate the rule "of the Supreme Court constitutional interpretation, although this violation has been in an oblique way. To achieve this objective this papper analise the Supreme Court of Brazil decision on the case *Brazil General Attorney v. Ceará State,* where the Brazil General Attorney challenged the Act 15.299/2013 of Ceará State, which regulates the *vaquejada* (a kind of bovine sport that allow participants to knock down the bull by the tail) to considering It as a sport and cultural practice. By 6 votes to 5, the Supreme Court considered that this practice violate the clause VII, § 1^0, article 225 of the Constitution. As the determining motives (*ratio decidendi)* of a decision is binding to all Courts and public administration, It means that any national, state or municipal Act or decision with similar content, this mean, that allows the overthrow of the bull by the tail, will be prevented from being applied, subjecting those who disobey the Supreme Court decision to judicial invalidation. Besides, this practice of animal abuse could be considering an environmental crime as provided for article 32 of the Act n.9.605/98. In short, the introduction of *stare decisis* doctrine in Brazil can anticipate and avoid future judicial conflicts, ensuring the security and stability of the Brazilian judicial system.

H

HEINONEN, SIRKKA (Finland Futures Research Centre (FFRC), University of Turku, Finland, *sirkka.heinonen@utu.fi*)

KARJALAINEN, JONI (Finland Futures Research Centre (FFRC), University of Turku, Finland, *joni.karjalainen@utu.fi*)

An Pioneer Analysis as Tool for Anticipation of Futures Agency – Case of Surprising Energy Futures

We are living in a world of ever increasing interconnectedness through digitalization, globalisation, exacerbating environmental conditions, severe economic challenges, uneven distribution of wealth, and geopolitical crises. We assume that more emphasis should be paid on the constant systematic identification and analysis of weak signals to detect emerging issues and their relevance. In analogy to weak signals, pioneers can be considered as agents of future creation. Outside the mainstream, pioneers are consciously building activities on the goals they see meaningful and

promising for the future. A pioneer is determinately looking for an opportunity for change. Pioneers are individuals, organisations or communities that are ready to tackle all obstacles of adopting new technology or innovations. By doing so, they create space for new social practices and demand for new products in the markets, needed for new ideas to spread. Accordingly, like weak signals, pioneers are identified as paving the way for emerging futures and opportunities. In our study, pioneer analysis is used to examine the pathway towards a future 100% renewable energy society, as envisioned in four transformational neo-carbon energy scenarios. These meta-scenarios have been tested through expert survey to identify corresponding pioneers in local and regional contexts. The key idea and hypothesis in this survey is that futures knowledge is obtainable by identifying these forerunners and learning from them proactively. Actors that resemble those in our Neo-Carbon Energy scenarios, already exist to some extent in today's societies. Therefore, they can be considered pioneers of these futures images, leading the way into sustainable Neo-Carbon futures. Because actions and decisions are made by characters in real-life, eventually these pioneering actors in society can make transformative scenarios to be realised. They can also provide futures knowledge of the potential systemic implications that stem from the adoption of the innovations and practices proposed by the pioneers.

HUSSAIN, NASIR (Medicines and Healthcare Products Regulatory Agency, Department of Health, London, *nasir.hussain@mhra.gsi.gov.uk*)

NIJJER, SANDEEP (QuintilesIMS, London),

Can elements from Problem Structuring Methods anticipate and manage uncertainties associated with future scenarios?

The UK's Department for Business, Innovation and Skills states that "scenarios do not predict the future; rather, they provide the means to consider today's policies and decision-making processes in light of potential future developments." However, the academic discourse does not explicitly anticipate the linkage between taking decisions now to possible scenarios emerging in the future.

To explore the feasibility of linking these two domains, scenarios for the pharmaceutical industry were developed using the intuitive logics approach and emergent uncertainties managed using Problem Structuring Methods (PSM). The pharmaceutical industry is a trillion-dollar sector but under severe health reimbursement pressure as the world grows and ages. Diminishing R&D productivity, economic austerity and tougher public expectations have forced it to rethink its business 'one size fits all' blockbuster model. Two types of mega-uncertainties emerged: i) *relationships*: institutional to individualized, and ii) *infrastructure*: cohesive to fragmented, resulting in four possible scenarios: mass health service, tailored service, patched-up healthcare, and privatized medicines.

PSM developed over the past 40 years in the European Operational Research address 'wicked problems' characterized by complexity, a high degree of uncertainty and multiple (stakeholder) subjectivity; constructing future scenarios and taking decisions now to meet future challenges is a prime example. In linking the two domains, elements of PSM, such as modelling human activity systems (from Soft Systems Methodology) and capturing three types of generalized uncertainties (using the Strategic Choice Approach) were used as anticipatory devices to surface and test assumptions.

PSM are also eminently suitable to address other types of uncertainties e.g. agonistic uncertainty: complex, self-referential system where network of conscious agents (individuals, organizations, nations etc.) act concurrently and react to each other. The emergence of the system is manifold and its development unpredictable.

We aim to present how PSM help to anticipate and manage uncertainties inherent in scenario development.

K

KURKI, SOFI (Finland Futures Research Centre, University of Turku, Helsinki, *Sofi.Kurki@utu.fi*)

Embedded anticipation in self-managed organisations

Anticipation is used for referring to any activity that uses the future for guiding decisions in the present. In this workshop I will present two case studies from low hierarchy organisations in service business, and reflect on the concept of anticipation in the context of their organisational practices. These companies are discarding traditional notions of strategy and foresight work in favour of a more organic approach to future making, which bases on a structure formed out of teams, a culture favouring openness and experimentation, and a constant effort by individuals to pick up and understand new issues emerging within their field. In the presentation, related concepts of effectuation and entrepreneurship as foresight will be explored in an effort to formulate a more nuanced understanding of how novel forms of organising that are at their core networked, often utilise shared purpose to concentrate collective efforts, and strive to create a long-term focus for their activities, use anticipation.

N

NICOLI, MARIA AUGUSTA (Agenzia Sociale e Sanitaria, Regione Emilia Romagna*,* *ANicoli@Regione.Emilia-Romagna.it*)

PELLEGRINO, VINCENZA (University of Parma*, vincenza.pellegrino@unipr.it*)

«How do you see the future of salaried work?» A case study focused on intergenerational elaboration of social policies

The analysis is based on data collected in an action research carried out in Ferrara and Parma (Emilia-Romagna Region, Northern Italy) 2013-2015, which is part of a wider local policy process (Local Health and Wellness planning by Community Lab Method http://assr.regione.emilia-romagna.it/it/ricerca-innovazione/innovazione-sociale/supporto-alla-governance/casi_studio_community_lab_prog_part_2013-2015). A series of “Workshops of the future” (Future Lab method [1]) and consecutive focus groups are designed to promote local policies for the “biographical continuity”, to be intended not only as policies of support to precarious income, but also as a policy for the "socialization of the precarious life and re-synchronization of individual pathways" [2]. This paper aims to interpret the representations on the future of wage labor in the age of precariousness as an emblematic case of intergenerational conflict respect to "possible futures" and to show how the representations of the future influence the policy-making processes today.

The precarious youth focus the debate around the idea of new forms of social recognition of the work by public institutions, for ex. a "material salary but not money": for example, they ask for access to housing and access to the consumption of publics “goods” (cinemas, libraries, etc.) in return for hours of community work. The debate focuses on proposals for salary (compensation) related to the house: "Okay, I'm a psychologist, but I would love to do the educator in the school in the afternoon, for example […] and in return I would score for a "public house", but also to enter in the co-housing, with elders… I would like very much". In short, there is a proliferation of new "political imaginary", for ex. centered on “barter” (barter between professional services and objects, and between different types of professional performance) and new hypotheses on institutional brokerage on work-related problems [3, 4].

On the other hand, the response of the trade union stakeholders, education and social services senior workers involved in the same participatory process was negative. In their opinion the “battle to do” is to ensure the protection of workers’ rights. Their fears are related to the debate on the relentless deregulation of the labor market. So, the principal fear is to favor new logic of exploitation and self-exploitation [5], a new "imprinting" the domestication of workers in a future “post salary” age of work [6].

This contrast between precarious workers and senior trade unionists and social workers is an example of the conflict between “forms of future”, between different anticipation capacities among the different generations, and this is

important. This example of a participatory process based on imagining the future shows the interest of the intergenerational dimension in the public debate.

References

[1] Jungk R., Müllert N. 1987, Future workshops: How to Create Desirable Futures, Institute for Social Inventions Pub, London; Stark W. 1996, Empowerment. New Concepts for Action in the Psychosocial Arena, Lambertus, Freiburg; Stark W. 2001, Future Labs - a tool for visioneering, disponibile al sito, http://www.federica.unina.it/lettere-e-filosofia/psicologia-sociale-comunita/swot-analysis-future-lab/

[2] Sennet R. 2006, The Culture of the New Capitalism Yale University Press

[3] Pellegrino V. 2013, Coltivare la capacità di rappresentare il futuro, "Im@go", n. 2 (II), 112-142

[4] Pellegrino V., Deriu M. 2016, La capacità di aspirare oggi tra "cronofrenia" e "utopia quotidiana", in Fabio Corbisiero, Elisabetta Ruspini (a cura di), Sociologia del futuro. Studiare la società del ventunesimo secolo, Cedam, Milano

[5] Lordon F. 2010, Frédéric Lordon, Capitalisme, désir et servitude, Paris, La Fabrique

[6] Chicchi F., Leopardi E., Lucarelli S. 2016, Logiche dello sfruttamento. Oltre la dissoluzione del rapporto salariale, Ombre Corte, Verona

---

P

PAURA, ROBERTO (Italian Institute for the Future, Napoli, *r.paura@futureinstitute.it*)

The notion of "existential risk" as a framework for the anticipation of technoscientific progress

The notion of "existential risk" has been proposed to define those risks that threaten the premature extinction of Earth-originating intelligent life or the permanent and drastic destruction of its potential for a desirable future development. It mainly refers to risks posed by emerging technologies and scientific breakthroughs to the future of humanity, the so-called "anthropogenic existential risks". As it has been underlined, the notion grounds its roots in the awareness that emerged during the Cold War of the new capabilities our civilization gained to destoy itself through an improper use of technoscience, e.g. nuclear weapons. Therefore, in an age of growing uncertainty related to the potential risks and benefits of science and technolgy, this notion can be considered a useful theoretical framework through which it can be possible to promote an anticipatory approach for a more efficient governance of technoscientific progress. Recently, several institutions and international research centers have been established with the aim of developing research approaches for the mitigation of existential risks. This presentation aims to analyze their practices and preliminary results, focusing in particular on the activities of the Future of Humanity Institute at Oxford University, the Centre for the Study of Existential Risk at Cambridge University, and the Future of Life Institute in Boston. The presentation highlights the way these three institutions contribute to develop an effective methodology for the study of potential risks and benefits in fields like artificial intelligence, genetic engineering, robotics, nanotechnology and fundamental sciences, and why it can be considered a useful approach to the anticipation of the medium and long-term social impact of research in science and technology.

R

RIZZO, GABRIELE (APF & Leonardo, *gabriele.rizzo@leonardocompany.com*)

Convergence, complexity and exponentiality: irresistible forces, irreconcilable antagonists

Exponentiality is a characteristic of a number of trends discernible in the present. At the same time, we are witnessing the surfacing of two apparently contrasting forces: the convergence of topics, trends and themes and the increasing complexity weaved in them. While in many cases, mostly technological, convergence is a virtuous player in a complexity loop, in others the two drive different evolving forces, as in social change, diplomacy and international relations, knowledge building, and the human domain.

We will review the current state of the art as perceived and brought by international organisations and propose different views per each of the examples proposed.

This will be a "converged" talk held at the same time in Anticipation, Agency, Complexity conference in Trento and at the Institute For The Future in Amsterdam.

S

SABETTA, LORENZO (Department of "Communication and Social Research", Sapienza – University of Rome, *lorenzo.sabetta@uniroma1.it*)

Self-defeating Prophecy: When Sociology Really Matters

Predictions (as well as classifications, regulations and criteria), due to their inner characteristic of being published, may have an influence on their own study subject and, in return, on themselves. On the basis of this assumption, in the context of a discontinuous debate, has been developed the consolidated distinction between self-fulfillingness and self-defeatingness, between predictions that come true because of their dissemination and others that, for the same dissemination, become false. The aim of the present paper is, primarily, to investigate the rationale underlying this distinction. In an innovative manner, it will be stated that self-fulfillingness always rests on causal unawareness. The definition of the situation, originally inadequate, does not take place as a consequence of the subject's beliefs. Inadequate means that it would not come true if it were not for subject's behaviour, which originates from fear, hope, misconception and social fatalism, and not from an adequate understanding of the situation. It is no coincidence that self-fulfilling prophecies always have a common sense background. Conversely, a self-defeating outcome invariably involves voluntariness. The prediction fails as a consequence of the renewed intentions of the subjects, who modify some aspects of their behaviour in response to the new awareness, preventing the prediction from happening. A new awareness caused by the prediction itself and related to its validity: if the subjects would not have been familiar with the prediction, this latter would not have been undermined – in this sense, it is a suicidal prophecy. From this perspective, the paper intends to show how the self-defeating process far from being something to avoid, is rather something to aspire to; and this, since the original Merton's definition of self-fulfilling prophecies, which purpose was to falsify itself, in order to break the vicious cycle of self-fulfillingness.

Essential Bibliography

Adorno, T.W. (1973), *Negative Dialectics*, New York, Continuum.
Azariadis, C. (1981), «Self-fulfilling Prophecies», *Journal of Economic Theory*, 25, pp. 380-396.
Buck, R. (1963), «Reflexive Predictions», *Philosophy of Science*, 30, 4, pp. 359-369.
Forges, F., Minelli, E. (1994), «Self-Fulfilling Mechanisms and Rational Expectations», *Center for Operations Research and Econometrics Papers*, Université Catholique de Louvain.
Gross, M. (2007), «The Unknown in Process: Dynamic Connections of Ignorance, Non-Knowledge and Related Concepts», *Current Sociology*, 55, 5, pp. 742-759.
Grunberg, E. (1986), «Predictability and Reflexivity», *The American Journal of Economics and Sociology*, 45, 4, pp. 475-488.
Hacking, I. (2002), *Historical Ontology*, Cambridge, Harvard University.
Henshel, R.L. (1971), «Sociology and Prediction», *The American Sociologist*, 6, 3, pp. 213-220.
Henshel, R.L. (1982a), «The boundary of the self-fulfilling prophecy and the dilemma of social prediction», *British Journal of Sociology*, 33, 4, pp. 511-528.
Henshel, R.L. (1982b), «Sociology and Social Forecasting», *Annual Review of Sociology*, 8, pp. 57-79.
Horkheimer, M. (1947), *Eclipse of Reason*, Oxford, Oxford University Press.

T

TASQUIER, GIULIA (Department of Physics and Astronomy, University of Bologna, *giulia.tasquier@gmail.com*)

BARELLI, ELEONORA (Department of Physics and Astronomy, University of Bologna, *eleonora.barelli@studio.unibo.it*)

BRANCHETTI, LAURA (Liceo Statale "G. M. Colombini", Piacenza, Italy, *branchetti.laura@gmail.com*)

LEVRINI, OLIVIA (Department of Physics and Astronomy, University of Bologna, *olivia.levrini2@unibo.it*)

Developing future-scaffolding skills through physics teaching at the secondary school level: The I SEE European project

How can physics teaching contribute to developing competencies for pushing imagination forward and to manage, rationally and emotionally, students' uncertainty about the future? In this talk, we address this question by presenting a teaching module on climate change designed to develop what we termed "future-scaffolding skills". The notion includes concepts that come from the science of complex systems and that can be turned into abilities to construct visions of the future that support possible ways of acting in the present with one's eye on the horizon. We refer, for example, to the concepts of "space of possibilities", "future scenarios", "projection instead of deterministic prediction", "feedback and circular causality". Our notion of "future-scaffolding skills" includes also transversal skills that labour market requires and that, meanwhile, can support students to push imagination toward the future. Future-scaffolding skills contain, for example: strategic thinking and planning, risk taking, possibilities thinking, managing uncertainty, creative thinking, modelling and argumentation. In the talk, we will present the module, as well as the pilot study we carried out to test if the module effectively impacted students' views of future. The module has been implemented with secondary school students (17 years old) from a scientifically-oriented secondary school in Italy (grade 12). The main result concerns the change in the perception of future that students' discourse reveals: from far and unimaginable, it became thinkable as a bunch of possibilities, addressable through concrete actions and at their reach, in the sense that they found room to see themselves agents of their own future. The positive results inspired the Erasmus + Project "I SEE – Inclusive STEM Education to Enhance the capacity to aspire and to imagine future careers", that started in September 2016 and involves 7 partners from 4 different countries.

Keywords: Climate change, science of complexity, future-scaffolding skills, secondary school students

---

V

VELAMOOR, SESHADRI R. (Trustee, Director of Programs (Retd), Foundation For the Future, Bellevue WA, USA, *seshvelamoor@gmail.com*)

Anticipation: As Managed Emergence.

The Background.

The activity of anticipation must be viewed in the context of the major phenomena, currently in process. These are best described by Dr. Laurence Smith, in his book.

The World in 2050. 1. Demographic. 2. Resources. 3. Climate Change and 4. Globalization. Additionally a significant number of transitions that are also in play as well. These are 1.Technologies that have transitioned from understanding the external world to technologies that are beginning to unravel the secrets of the "internals" of humans, specifically, the Human Genome. 2. A second major transition is what can be described as movement away from Faith and Belief Systems opposed by geometrically increasing knowledge via the Scientific Method. And finally a transition away from collectivizing social, political, economic and cultural systems to systems that are increasingly focused on the individual.

Understanding the Future as Managed Emergence:

In almost every aspect of human life, for the last two millennia, human agency has been assigned the role of being the first and only determinant of outcomes as they relate to futures, sanctioned by religious dogma, accelerated by the discovery of the Scientific Method, and cemented as incontrovertible truth with the elevation of Democracy and its attendant emphasis on Individualism .

However, as we examine the past, especially in light of the validation of Evolution in both the Genetic and Memetic spheres, it becomes clear that the future is an emergence, an outcome of a complex interplay of extraordinarily large number of variables, all operating simultaneously in human affairs.. This can be elaborated within the framework of a three dimensional matrix of Cultural systems, Environmental systems and Human identities with Human inputs as "active walkers" in a bottom up fashion within a radically redefined operant paradigm.

A redefined paradigm that as a starting point, resets ideas pertaining to humans not as autonomous, dominant drivers but as part of an interdependent system over longer periods of time than commonly accepted, and secondly that human futures is an "emergence". Rather than as a designed outcome based on directed effort. Some concepts that are involved in understanding these principles are: Chaos Theory, Fractals, Critical Mass, Tipping Points.

Successful anticipation, assuring the survival of humans as a species will require nothing less. Business as usual within the current paradigm of humans as paramount is doomed to fail, if it has not already, and may very well foreshadow the extinction of our species.

VON MITSCHKE-COLLANDE, JOSÉPHINE (Programme Manager, Innaxis Research Institute, Switzerland, *jvmc@innaxis.org*)

Towards a Society of Living: Integrating different anticipatory designs from Complexity Theory and Life Sciences for Transformation

Humanity finds itself at the tuning point of an era with a huge potential of change. In particular, alternative ways of living, as well as entrepreneurial visions developed in niches and subcultures are praised for their potential of change for a more just and sustainable society. However, during their dissemination process they lose the capacity to impact effectively the root causes of our societal dysfunctions. Systemic hurdles prevent these initiatives to drive fundamental transformation, as very often they become themselves a mean for legitimizing the status quo and reinforcing unsustainable trends. The current state of transformation research when explaining the bottleneck of how to go from local seeds to a global change often uses mechanistic approaches and frameworks rooted in management thinking to envision large-scale intentional change in a controllable path towards sustainability, set by goals and indicators. However we believe in a radically different anticipatory approaches for change rooted in the findings of systems thinking and complexity sciences and ultimately in life itself. Autonomy and connectedness is the dual principle underlying the complex, networked nature of dynamical systems and in particular of living organisms, everything from bacteria and human beings to ecosystems and societies, which share a common resistance to predictability and controllability, although they can develop emergent properties such as self-organization and self-consciousness. Hence the challenge of transformation research is to embrace such concepts from complexity theory and life sciences in order to pursue a purposeful evolution without controlling it. This contribution proposes an agenda for further research in that direction.

Key words: Transformation, Complexity, Sustainability, Niches, Subcultures, Systems Thinking, Life Sciences, Societal Transformation, Anticipation

---

W

WEILER, RAOUL A. (Faculty Bio-engineering Sciences, University of Leuven, *raoul.weiler@telenet.be*)

Food scarcity unavoidable by 2100?

Food for everyone is a *humanistic objective*, however by far not reached yet and the balance projected to the end of the 21st century is *not quite optimistic*. One of the major reasons lies in the planetary *demographic expansion* of some three additional billion individuals, plus the still undernourished of about one billion people and the *global warming*

and *extreme weather* phenomena. Both occur simultaneously in the 21st century and call for an *overarching world governance institution,* which mission is vital for the human species .

The research project makes use of the Climate Classification System from Wladimir Köppen and Rudolf Geiger. It addresses climate phenomena independently from legal borders; about 25 terrestrial Climate Zones are used. The demographic increase requires to look in a different way to the significance for the survival of the human species. The data are taken from UN ECOSOC Population Division and cover the period 1950-2300 for the continents. The New Sciences of Networks emerged some decades ago and have not used for analyzing the food *'problématique'. The 'open source' software Gephi (The Open Graph Viz Platform) and the program language, R, for statistical analyses are applied.* The diagrams: adjacency matrix, dendrograms, decision trees and the Kamada Kawei algorithm describe the correlations among Climate Zones and the agricultural parameters: crops, meat, arable land and fresh water. *Agricultural output* will have to provide food for some >10 billion people, meaning some 3-4 billion more than today, including the undernourished. The new approaches focus on the urgent need for a global approach over a long period of time, and formulate practical possible agricultural action domains. Special focus is given to the situation in some parts of the planet. Globally: *Optimism is not enough!*

Z

ZABOROWSKI, ROBERT (University of Warmia and Mazury, Poland, *thymos2001@yahoo.fr*)

Multilayeredness of anticipation

"It is my favourite occupation to gaze at the starry heavens at night – that being the best way to turn my eyes away from earth and from life. And perhaps it may be pardoned in me that I still cling to my distant hopes? That I dream of a freer life, where the actuality of my fondest anticipations is revealed to be without any torturing residue of disillusionment? Of a life where there are no more horizons?

"So I dream and wait for death. Ah, how well I know it already, death, that last disappointment! At my last moment I shall be saying to myself: 'So this is the great experience -- well, and what of it? What is it after all?'" (*Disillusionment* (1896) by T. Mann, transl. H. T. Lowe–Porter)

These words express a sentiment of the multilayeredness of future perspectives. Hopes are less and more distant, more and less precise and more and less fond, but all is restricted by a death of the individual. Even if his projects can aim at to the beyond the individual will not see the future as instantiated. But the split between the future lifetime and the beyond set the individual's anticipations on different levels. The paper will discuss in what sense various anticipations emerging in individual's form hierarchical systems, not reducible levels one to another, and in what way they determine individual choices and decisions.

Index of Authors