

Programme Summary

8:30 – 9:00	Coffee
9:00 – 9:05	<i>Welcome.</i> Philipp Marxgut
9:05 – 9:10	<i>The spirit of this meeting.</i> Geraldine Cox
9:10 – 9:15	<i>The spirit of this meeting.</i> Henrik Jeldtoft Jensen
9:15 – 9:45	<i>On the secrets of the Ginkgo tree....</i> Lucilla de Arcangelis
9:45 – 10:15	<i>Utopia - The Migrant's Tale.</i> Michael Weinstock
10:15 – 10:22	Discussion
10:22 – 10:42	Coffee + Discussion
10:42 – 11:12	<i>Ginkgo Tapestries.</i> Geraldine Cox
11:12 – 11:42	<i>Ginkgo trees, horseshoe crabs and platypuses – On the meaning of evolutionary age.</i> Susanna Manrubia
11:42 – 12:12	<i>Of words and worlds - between process and construct.</i> Rudolf Hanel
12:12 – 12:19	Discussion
12:19 – 13:19	Lunch + Discussion
13:19 – 13:49	<i>The Ginkgo Model of Societal Crisis.</i> Peter Turchin
13:49 – 14:19	<i>Transcultural discussion of complex ideas at the computational turn. An historical approach.</i> Andrea Nanetti
14:19 – 14:49	<i>The Tale of one Tree: A Linguist's Take on the Ginkgo Biloba.</i> Michał B. Paradowski
14:49 – 14:56	Discussion
14:56 – 15:16	Coffee + Discussion
15:16 – 15:46	<i>About Growth.</i> Olaf Osten
15:46 – 16:16	<i>The Ginkgo Design Manifesto.</i> Harald Gründl
16:16 – 16:46	<i>The interconnectedness and unity of the world.</i> Henrik Jeldtoft Jensen
16:46 – 17:00	Discussion + Finish
17:00	Drinks + Discussion

On the secrets of the Ginkgo tree....

Lucilla de Arcangelis
Department of Engineering
University of Campania "Luigi Vanvitelli", Italy

Complexity is characterized by the emergence of unexpected macroscopic behaviour in systems with many components interacting with simple local rules. This concept is illustrated taking as examples the brain and the Earth's crust and stressing the meaning of self-similarity, universality and self-organization. These ideas are applied to discuss three chosen features of the Ginkgo tree: The structure of the leaf, the sexual differentiation and the reproduction mechanism, bridging these features to well-known properties of the brain.

About: Lucilla de Arcangelis received the Ph.D. in Physics from the Boston University. She was visiting scientist at the University of Cologne and the CEA in Saclay. In 1990 she was awarded a CNRS (CR1) position at the ESPCI in Paris and in 1993 a Faculty position in Italy. Her research interests span from percolation, fractals, cellular automata to spin glass, models for fracture and gelation. Recently, she has focused her research on statistical properties of earthquake and solar flare occurrence and on the critical features of spontaneous neuronal activity. She is associate Editor of Physica A and Frontiers in Physiology. Since 2018 she is secretary of the C3 IUPAP Commission. <http://www.lucilladearcangelis.it/>

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Utopia - The Migrant's Tale

Michael Weinstock
Dr. Michael Weinstock, RIBA, FRSA
Director Research and Development; Director Emergent Technologies and Design

My published research has been in the dynamics, forms and energy transactions of natural systems, and the abstraction and systematisation of knowledge of biological morphogenesis and evolution that contribute to innovative computational processes of architectural design and materialisation that are necessary to sustain human societies through the impending changes of climate and ecology.

My current focus is on defining new models of ecological intelligence for future cities in a changed world, with a special focus on developing new paradigms for sentient cities in extreme climates and ecological contexts. The ambition is to develop new paradigms for intelligent cities and settlements in the emergent climates, cultures and ecological contexts of the future, concentrating on deserts, salt marshes and wetlands, and on the tundra.

About: Michael Weinstock is an Architect, and a Fellow of the Royal Society of Arts. He is the Founder and a Director of the Emergent Technologies and Design programme in the Graduate School of the Architectural Association. Studied Architecture at the Architectural Association 1982/88 and has taught at the AA School of Architecture since 1989 in a range of positions from workshop tutor through to Academic Head. Over the last decade his published work has arisen from research into the dynamics, forms and energy transactions of natural systems, and the application of the mathematics and processes of emergence to cities, to groups of buildings within cities and to individual buildings. Whilst his principal research and teaching has been conducted at the Architectural Association, he has published and lectured widely, and taught seminar courses, studios and workshops on these topics at many other schools of Architecture in Europe, including Universities of Delft (TU), Rome (Roma Tre), Barcelona (Esarq, Elisava, Pompeo Fabra and IAAC), Vienna and Stuttgart; and in the United States at

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Berkeley, USC, Yale, Harvard and Rice, and at Calgary in Canada and Tokyo in Japan.
<http://phd.aaschool.ac.uk/faculty/michael-weinstock/>

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Ginkgo Tapestries

Geraldine Cox

Artist

Department of Physics, Imperial College London

I will sketch several complementary perspectives that illustrate the rich and varied interconnections that make our world. I'll consider how things interact to become wholly new things, highlight the remarkable patterns that reoccur across the world and celebrate the host of eyes and minds needed to understand anything. My talk is illustrated by pictures, drawings, film and prose and will begin with an extract from a 1964 lecture by physicist Richard Feynman in which he outlines his thoughts on a nascent hierarchy of complexity. The ginkgo tree will be a leading player.

About: Since 2010 I am working as Leverhulme Artist in Residence at the Physics Department of Imperial College London. I have a training in fine art and physics and my interest is in finding new ways to talk about our understanding and expressing the experience of finding things out. I work with scientists at Imperial and around the world. I also develop educational projects in schools that embrace the pluralistic way of seeing the world that children naturally have. <https://www.findingpatterns.info>

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Ginkgo trees, horseshoe crabs and platypuses – On the meaning of evolutionary age

Susanna Manrubia

Associate Professor/Investigadora Científica

Centro Nacional de Biotecnología, Madrid

The ginkgo tree is a living fossil. This term applies to organisms whose appearance has remained unchanged for a long evolutionary time. How is this possible? Are there any particularities in the biology of living fossils? How are patterns and processes interlaced? Are we facing chance or necessity? Do species age? Is there an arrow of time in evolution? Can these questions be answered with extant information? By presenting additional examples of this appealing category, I will discuss some thoughts on the meaning of change and age from an evolutionary perspective.

About: I hold a degree and a PhD in Physics. My research experience started in the early '90, well in the field of what is now known as Complex Systems. But my main interest is evolution at large, meaning how blind, collective, emerging mechanisms shape the world that we see. I believe evolution is hard to grasp because it works at time scales that we do not have empirical access to, in the same way that quantum mechanics seems odd because our brain is not shaped through a quantum perception of reality. It is impossible to derive a sound evolutionary theory "by thinking", since our intuition repeatedly fails. Only by dissecting as many case examples as possible --fighting to derive process from pattern-- and applying the synthetic way of reasoning of physics may we arrive at an understanding of the way evolution works. W: <https://auditore.cab.inta-csic.es/manrubia/>

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Of words and worlds - between process and construct

Rudolf Hanel

Research Assistant

Section for Science of Complex Systems, Medical University of Vienna

I'd like to contribute with a little talk where I try to sketch the potential of complexity science to become a science of the "cognitive ribbon" that we require to stitch back together into a whole the things we take apart to study them. The whole that can only mean open but operationally reasonably closed systems such as earth, which makes us an integral part of the system we, at least potentially, try to understand, with all its interacting subsystems and their interfaces, such as the system of human economy interfacing with global ecology. This reflexive situation however has far reaching implications and raises the question of method, cognition, and story. One major implication being that science becomes an art of cognition within a larger art of being a part of a world that we only fragmentarily understand including ourselves. A world that we cannot merely approach retrospectively but as a world that is always becoming something else with us playing an integral and to some extent conscious role in this ongoing transformation. But method means physical algorithm. Method (including the scientific method) is the art of action we follow and implement physically that develops how we perceive world, ourselves, the language we use to describe world, how we build our facts in lingual and mathematical form, and how we exercise and fill our repertoire of actions. With humans in the picture earth sciences cannot be predictive or effective by only learning how to handle the rational part of the physical world. Here science may not ignore the realm of the fantastic we ourselves as a biological species bring to the table with all that comes from our deepest insights to our maddest delusions. Can a constructivist approach help us to model and devise adequate methods for such an art and what can be accomplished?

About: <http://www.complex-systems.meduniwien.ac.at/people/rhanel/>

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The Ginkgo Model of Societal Crisis

Peter Turchin

Professor, University of Connecticut and Complexity Science Hub–Vienna

I will use the Ginkgo leaf as an analogy for how complex human societies enter crisis periods, and then emerge from them. The trajectories of entry into crisis are fairly narrowly channelized (this is the petiole, or the leaf stalk). But once the crisis breaks out, suddenly a much broader fan of possibilities opens up, just like in a Ginkgo leaf. Some post-crisis trajectories go to a really dire territory: a bloody civil war, a revolution bringing an oppressive regime, or disintegration of the state into a number of territorial sections. Other post-crisis trajectories are less dire. In the best scenario, the elites manage to pull together and implement the reforms needed to defuse the pressures for crisis.

About: Peter Turchin is a Professor at the University of Connecticut, External Professor at the Complexity Science Hub-Vienna, and Research Associate in the School of Anthropology at the University of Oxford. He conducts research on the cultural evolution and historical dynamics of past and present societies. He is the author of seven books, including *War and Peace and War* (2005), *Secular Cycles*(2009), and most recently *Ultrasociety* (2016) and *Ages of Discord*(2016).

Peter Turchin was trained as a theoretical biologist, but during the last twenty years he has been working in the field of historical social science that he and his colleagues call Cliodynamics. His research interests lie at the intersection of sociocultural evolution, historical macrosociology, economic history and cliometrics, mathematical modeling of long-term social processes, and the construction and

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analysis of historical databases. Over the past decade Turchin has been investigating two broad and interrelated questions: what general mechanisms explain the collapse of historical empires? And how did large-scale states and empires evolve in the first place? More specifically, what are the social forces that hold together huge human conglomerates, and under what conditions they fail? Turchin uses the theoretical framework of cultural multilevel selection to address these questions. Currently his main research effort is directed at coordinating Seshat: Global History Databank—a massive historical database of cultural evolution that our team is using in empirical tests of theoretical predictions coming from various social evolution theories. <http://peterturchin.com/>

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Transcultural discussion of complex ideas at the computational turn. An historical approach.

Andrea Nanetti

Associate Professor, Associate Chair (Research), ADM, School of Art, Design and Media, Singapore.

This presentation investigates issues and presents solutions for scholars and practitioners from different disciplines that aim to discuss complex ideas at the computational turn. The discussion moves from and is inspired by the history of learning and knowledge aggregation using the Ginkgo Biloba as a showcase.

About: Dr. Andrea Nanetti received his university education in Historical Sciences in several countries (Italy, France, Germany, Greece, USA) through the cross-fertilization of different methodologies (historical, philological, aesthetic, anthropological, computational). He now serves as Associate Chair (Research) in the School of Art, Design and Media at the Nanyang Technological University Singapore. <http://andreananetti.com/>

Co-Author: Hedren Sum is a digital scholarship librarian at Nanyang Technological University Singapore. He has led local and international digital humanities projects with expertise in data organisation, archiving and visualisation for access and discovery. Hedren received his MSc (Information Studies) and BSc (Information Systems Management) from NTU and Singapore Management University respectively.

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The Tale of one Tree: A Linguist's Take on the Ginkgo Biloba

Michał B. Paradowski

Institute of Applied Linguistics, University of Warsaw

Can the word 'ginkgo' explain how the tree has spread around the world? Can language sciences help unearth invisible properties of the tree or explain its growth? Can they predict the success rate of different sub-species? Do ginkgo trees communicate? Why may transplanted trees be more similar to the ancestors? This talk will explore how linguistics can shed non-trivial light on these and other exciting questions.

About: Michał B. Paradowski is an associate professor at the Institute of Applied Linguistics, University of Warsaw, a teacher and translator trainer, and a language teaching consultant for television. His interests include English as a lingua franca, second and third language acquisition research, foreign language teaching, bilingualism and bilingual education, embodied cognition, educational technology, and complexity science. To this date he has given over 140 invited lectures, seminars and workshops in Europe, America, Africa and Asia, including in universities from the top of world rankings. His recent edited volumes are *Teaching Languages off the Beaten Track* (2014) and *Productive Foreign Language Skills for an Intercultural World* (2015); his latest (2017) monograph appeared under the title *M/Other*

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Tongues in Language Acquisition, Instruction, and Use. In his free time Michał enjoys cross-country and mountain hiking, cooking, and the performing arts. <http://uw.academia.edu/paradowski>

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About Growth

Olaf Osten

Artist and Graphic Designer

Trees have always made me feel safe, especially the resistant ones – like the Ginkgo Biloba. What can we learn from the Ginkgo on a general level? As an artist I am interested in the unknown, the subconscious and complex issues. Unfortunately our work usually does not give us the position to find concrete solutions for concrete problems, but we can at least try to provoke new ideas for different contexts, e.g. scientific ones. I want to invite you to a visual and metaphorical 20-minutes-walk through my forest.

About: Olaf Osten (*1972) is an artist and graphic designer based in Vienna. His work has been presented in a range of exhibitions in several countries and is represented e.g. in the collections of the International Peace Institute, Wien Museum, Austrian Chancellor Ministry. He is active in a wide variety of interdisciplinary contexts, with cooperations including the Impulstanz Festival, Wiener Festwochen or mumok / Museum moderner Kunst Stiftung Ludwig Wien. <http://www.olaf-osten.com/>

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The Ginkgo Design Manifesto

Harald Gründl

Designer, design theorist and curator.

Institute of Design Research Vienna, EOOS Design

The name “Ginkgo” is working well as globalized brand name like “Coca-Cola” and the outside shape of the leaves are as significant as the outline of a Porsche 911. Researching the influence in contemporary design I found only few examples referring to the Ginkgo: a wallpaper, a plywood chair and a carbon fibre table one-off. All these take the significance of the leaf as a reference for the design. A more depth inspiration on the level of bio mimicry is missing, in the contrary, the materials and the way they are done are not sustainable. The most pressing transformation in design is to move towards a circular design. Circularity is the major lesson we have not yet learned from nature. Design projects in the future should fit either into a biological or technical cycle. In both cases no waste will be produced. But circular design is not a technical problem, it is a social one.

Working since years on tools and strategies for sustainable design the question what a tree that has not changed since millions of years can contribute to my research is fascinating and in the same time frightening. I started my research with pencil drawings of visual findings. Drawing is a tool for better understanding, getting the idea of something with only a few pencil strokes. My research on ritual and design is also helpful in understanding magical practices of the humans in relation to that tree. Finally I came up with the idea of a “Ginkgo Design Manifesto” to write down my learnings from researching the Ginkgo tree as designer and design theorist.

About: Dr. habil. Harald Gruendl is designer, design theorist and curator. He is the founder of the IDR – Institute of Design Research Vienna and managing partner at EOOS Design. Harald teaches design theory as well as design practice. Harald was Visiting Professor at the Institute of Industrial Design, Shih-Chien University Taipei and at the HFBK in Hamburg. Since 2018 he hosts a PhD seminar at the

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University of Applied Arts Vienna. His current research focuses on transition design for complex design systems. In 2015 and 2017 he was guest curator of the Vienna Biennale. Since 2016 he is curator of the CityFactory, a “real-time” research laboratory for new fields of work in the creative industries. With the IDRV Harald edited and co-authored several books, including “Tools for the Design Revolution” (Niggli, 2014). <http://www.idrv.org/team/>

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The interconnectedness and unity of the world

Henrik Jeldtoft Jensen
*Professor, Centre for Complexity Science
Imperial College London*

Niels Bohr gave talks with titles like “The Unity of Knowledge” or “Physics and the Problem of Life”. He pointed out the importance of cross fertilisation between different human intellectual endeavours. An insight that is often neglected. Complexity science is trying to identify systematic generalities of processes emerging across the unified cosmos of the human and natural world. As an example try to comprehend the Ginkgo in its totality of relations.

About: Henrik Jeldtoft Jensen is a professor of mathematical physics, heads the Centre for Complexity Science at Imperial College London. He works on the statistical mechanics of complex systems, the development of the Tangled Nature model of co-evolutionary dynamics and has worked on brain dynamics and structure by analysing fMRI and EEG data. He is also involved in an exciting project together with the Guildhall School of Music and Drama concerning quantitative analysis of audience and performers during improvised or non-improvised classical music.

<http://www2.imperial.ac.uk/~hjjens/>