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SYNTHETIC

# SPEAKERS & ARTISTS

BIOLOGY

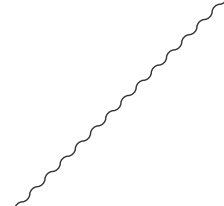
BIO-FICTION Science Art Film Festival  
23 - 25.10.2014 - Vienna, Austria



**BIO·FICTION**  
SCIENCE ART FILMFESTIVAL



Hasenblut+ (Klaus SPIESS and Lucie STRECKER)



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**“The second** *BIO-FICTION Science Art and Film Festival 2014 returns with a unique trans-disciplinary conference program, artworks and performances, biohacker workshops and of course a selection of the best short films on synthetic biology, the science of making biology easier to engineer. The festival is also an effort to support responsible research and innovation in synthetic biology by enabling a colourful platform to present and discuss various societal and technological futures.*

*We gather some of the best scientists, social scientists, designers, artists, biohackers and filmmakers to make BIO-FICTION a fantastic experience for all participants. Merging intellectual with aesthetic approaches, we try to overcome the artificial division between the cognitive faculties that sometimes seem to limit the way we envisage our common (synthetic) future. At BIO-FICTION, the exhausted Homo sapiens broadens his understanding of synthetic biology by engaging with Homo faber, H. oeconomicus, H. aestheticus, H. societatis and even H. ludens. If our technosocial dreams will eventually come true, we should really understand what we wish for.*”

**Markus SCHMIDT**

Biofaction KG and BIO-FICTION Founder



# About Synthetic Biology

**Synthetic biology** is a new area of biological research that combines science and engineering. Synthetic biology encompasses a variety of different approaches, methodologies and disciplines, with the aim to design and construct new biological functions and systems not found in nature. Synthetic biology is based on genetic engineering but goes much further. It aims at creating whole new biological functions, systems and eventually organisms.

**In short:** synthetic biology is the application of science, technology and engineering to facilitate and accelerate the design, manufacture and/or modification of genetic materials in living organisms

**Synthetic biology** includes the following research areas:

**1. Engineering DNA-based biological circuits,** including standard biological parts: Instead of just transferring one gene, a whole system is built in an organisms (e.g. an oscillator, an on-off switch, a complicated multi-step chemical synthesis of a useful biomolecule).

**2. Defining a minimal genome/minimal life:** Taking a bacteria that already has a very small genome (i.e. number of base pairs) and reduce it even further until the organisms cannot survive any longer. That way we can define and understand the smallest possible genome that still sustains life. This minimal life will also form a „chassis“ for hosting the biocircuits described above.

**3. Constructing synthetic cells or protocells from scratch or bottom-up:** In an attempt to prove Pasteur's "law of biogenesis" (Omne vivum ex vivo, Latin for, "all life [is] from life") incomplete, scientists are now trying to produce synthetic cellular life form from simple chemical ingredients.

**4. Xenobiology:** All forms of life on earth use the famous DNA molecule. Now scientists are constructing different molecules with similar functions (e.g. the XNA, Xeno- nucleic acid) to construct living systems that have never existed before, as a way to avoid interference with naturally evolved DNA.

**5. The chemical synthesis of DNA.** So far DNA could only be created by life itself, but now special DNA synthesis machines can actually "print" DNA the way we want it. Scientist can e.g. download the genetic code of a virus or bacteria and construct its DNA with this machine.

# THUR

## 23/10/14



12:00 - 13:30 / NHM

REGISTRATION & LUNCH ☕

13:00 - 13:30 / NHM

🎬 FILM: SYNTHETIC BIOLOGY IN EUROPE

13:30 - 13:45 / NHM

WELCOME

Markus SCHMIDT

13:45 - 15:15 / NHM

● HOMO FABER: ENGINEERING LIFE P 12

Moderator: Lei PEI

- Christopher COENEN: SYNENERGENE - The European Synthetic Biology RRI Initiative
- Vitor MARTINS DOS SANTOS: Re-programming Living Matter
- Ned BUDISA: Expanded Genetic Code as a Route to Change the Basic Chemistry of Life
- Uwe SLEYTR: A Technology Based on Living Parts
- Philippe MARLIERE: Charting the Xenobiotic Continent

15:15 - 15:45 / NHM

COFFEE BREAK & INTERACTION ☕

15:45 - 17:00 / NHM

🎬 FILM: BIOART, ART FROM THE LABORATORY

55min. Thereafter discussion with Robert STYBLO.

17:00 - 18:30 / NHM

● HOMO AESTHETICUS:  
LIFE AS MEDIUM FOR ARTISTIC EXPRESSION P 18

Moderator: Günter SEYFRIED

- Jens HAUSER: 'The new Green'? Art between Synthetic Biology and Biohacking
- Richard PELL: That was Then... This is Now: Recent Developments in Postnatural History
- Herwig WEISER: Phantom Lucid Messenger
- Erich BERGER: HYBRID MATTERS
- Anna DUMITRIU: Trust Me, I'm an Artist - Towards an Ethics of Art and Science Collaboration

19:45 - 21:00 / Narrenturm

21:15 - 22:30 / Narrenturm

★ PERFORMANCE: HARE'S BLOOD+ P 24

*Registration required, please email [registration@bio-fiction.com](mailto:registration@bio-fiction.com).*

*45 people max. per time slot.*

Klaus SPIESS (Medical University Vienna, Austria) and

Lucie STRECKER (Performance Artist and Scenographer, Germany)

20:00 - 21:00 / BELLARIA CINEMA

🎬 FILM SCREENING: FICTION VISION

21:15 - 21:45 / BELLARIA CINEMA

🎬 FILM SCREENING: FICTION DESIGN



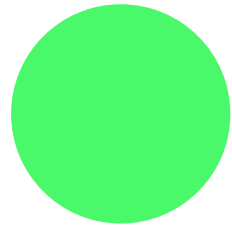
## SYNERGENE - the European Synthetic Biology RRI Initiative

SYNERGENE is a dialogue and agenda-setting project dealing with, promoting and enacting Responsible Research and Innovation (RRI) in synthetic biology. Funded by the EU, it encompasses more than 25 European and international partners. The project aims to involve citizens and a wide variety of stakeholders in the social shaping of the field, foster an open dialogue about potential benefits and risks, and explore what responsible governance of synthetic biology might entail. SYNERGENE is designed to be a highly interactive project that is flexible enough to accommodate the dynamics of an emergent field, allow citizens to get involved and offer manifold opportunities for other initiatives and organisations to cooperate with it. Amongst other things, the initiative will organise more than 100 events. In the talk, the approach of SYNERGENE will be put forward for discussion and options for engagement in / cooperation with SYNERGENE will be described in some detail.

### Christopher COENEN

Karlsruhe Institute of Technology - ITAS, Germany

Christopher Coenen is a senior researcher at the Karlsruhe Institute of Technology's Institute for Technology Assessment and Systems Analysis (KIT-ITAS). Before moving to Karlsruhe in 2009, Coenen was based in Berlin at the Office of Technology Assessment at the German Parliament (TAB), which is run by KIT-ITAS. He is in charge of the coordination of the EU-funded project "SYNERGENE" on synthetic biology (a large-scale stakeholder and public dialogue action plan with more than 20 partners from three continents) and is editor in chief of the journal NanoEthics, 'KIT Expert' for the topic 'human enhancement' and S.NET board member.



13:45 - 15:15 / NHM

## HOMO FABER. ENGINEERING LIFE

Moderator: Lei PEI

- Christopher COENEN:  
SYNERGENE - The European Synthetic Biology RRI Initiative
- Vitor MARTINS DOS SANTOS:  
Re-programming Living Matter
- Ned BUDISA:  
Expanded Genetic Code as a Route to Change the Basic Chemistry of Life
- Uwe SLEYTR:  
A Technology Based on Living Parts
- Philippe MARLIERE:  
Charting the Xenobiotic Continent





## Re-programming Living Matter

Since its birth, humankind has always tried to change the living world to its advantage, either by domesticating animals, making beer or grafting cultivable plants. Synthetic Biology has the potential of enabling us to tailor the biological world much more precisely and drastically. I will report on a number of efforts to streamline and re-program microbes for the productions of valuable chemicals and products. We resort to tools of engineering, mathematics and molecular biology to re-shuffle genomes, build light-driven control systems and re-design genetic circuits, thereby radically altering the functioning and nature of microorganisms by plug and playing at will.

### Vitor MARTINS DOS SANTOS

Laboratory of Systems and Synthetic Biology -  
Wageningen University, Netherlands

Vitor Martins dos Santos holds the Chair for Systems and Synthetic Biology at the Wageningen University, the Netherlands, is the Director of the Wageningen Centre for Systems Biology and President of the Dutch Society of Biotechnology. He founded and is the CSO of Lifeglimmer GmbH, Berlin. He has coordinated and participates in numerous national and international projects in Systems and Synthetic Biology, has been advising in science and governance policies, and carried out intense research in the field. A major thrust of his research is the streamlining of microbial chassis and (computer-assisted) re-programming of cellular behaviour for medical, industrial and environmental applications.



## Expanded Genetic Code as a Route to Change the Basic Chemistry of Life

In the 21st century, biology, being previously dominant analytical science has reached a point of being the science of synthesis i.e. synthetic biology. From this perspective, I will argue that the utmost goal of such engineering biology is to attempt to change the chemical composition of the living cells i.e. to create artificial biodiversity in the frame of carbon-based life chemistry. Thereby, the main obstacle is to find an expedient route to change and expand the fundamental chemistry of life. One of the most promising approaches towards synthetic cell design is the inclusion of amino acid building blocks beyond the canonical 20 (i.e. expanding the genetic code) allowing for an alternative reading of the genetic code. Thus, I will briefly elaborate on the challenges as well as possible consequences of expanding the genetic code and metabolism of microbial strains for using novel bio-orthogonal chemistries recruited during the engineering process. For example, re-programming protein biosynthesis with various noncanonical amino acids will allow the development of industrial microbial strains with enhanced chemical diversity. In consequence, this would enable the creation of safe strains with novel functionalities such as a 'genetic firewall', which could potentially be

a novel biosafety tool. Such synthetic cells characterized by orthogonal chemistries will have the potential to perform (bio)-chemical transformations currently existing under the exclusive domain of classical synthetic chemistry. In this journey, we will witness the consolidation of Xenobiology, a marriage of chemical synthesis with synthetic biology, to build artificial biological systems for challenging biochemical transformations to address technological problems, while opening the door to a parallel biochemical world.

### Ned BUDISA

TU Berlin -  
Department of Chemistry, Germany

Nediljko Budisa received his PhD degree in 1997 under Robert Huber. He was at the Max Planck Institute of Biochemistry in Martinsried (Germany) in the time period between 1993 -2010 as a PhD student, postdoc, assistant professor and independent research group leader. After vocation in 2008, he continues to hold the Chair of Biocatalysis at TU Berlin since May 2010. In 2004, he received the BioFuture prize; he is the single-handed author of the book "Engineering the Genetic Code" and one of the pioneers of this area of research. His research, in the core of the Synthetic Biology, is aimed to provide a solid basis for laboratory evolution of synthetic life forms with novel chemical possibilities.





## A Technology Based on Living Parts

Monomolecular arrays of protein and glycoprotein subunits forming surface layers (S-layers) are one of the most commonly observed prokaryotic cell envelope components and can be considered as one of the most abundant biopolymers on our planet. Most important physicochemical properties and functional groups on the protein lattice are arranged in well-defined positions. Many applications of S-layers depend on the capability of isolated subunits to reassemble into monomolecular arrays in suspension or on suitable surfaces (e.g. polymers, metals, silicon wafers) or interfaces (e.g. lipid films, liposomes, emulsomes). S-layers also represent a unique structural basis and patterning element for generating more complex supramolecular structures involving all major classes of biological molecules (e.g. proteins, lipids, glycans, nucleic acids). Thus, S-layers fulfil key requirements as building blocks and patterning elements for the production of new supramolecular materials and nanoscale devices as requires in nanobiotechnology, synthetic biology and biomimetics.

for review: Sleytr, U.B. et al. FEMS Microbiol. Rev. (2014) in press.

### Uwe SLEYTR

University of Natural Resources and Life Sciences,  
Department for Nanobiotechnology, Austria

Uwe B. Sleytr studied Food and Biotechnology in Vienna. Senior research scientist at the MRC-Laboratory for Molecular Biology and the Strangeways Research Laboratory, Cambridge, England (1972-1975), and visiting professor at the Department of Microbiology and Immunology, Temple University, Philadelphia, USA (1977-1978). From 1982-2010 head of the Department of NanoBiotechnology, University of Natural Resources and Life Sciences, Vienna, Austria. Numerous awards and member of the Austrian Academy of Sciences, the New York Academy of Sciences, and the European Academy of Sciences and Arts. Honorary Professor appointments at Sichuan University, Chengdu, China, China University of Petroleum, Qingdao, Shandong, China, and Shanghai Jiao Tong University. Fellow of the American Institute for Medical and Biological Engineering, 420 publications, 4 books, several international patents.



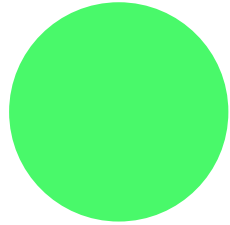
## Charting the Xenobiotic Continent

Recent experiments in vitro and in vivo are invalidating the assumption that all possible biochemical constitutions were exhaustively generated during evolution and that the best one among them all was selected. Recognizing the naturalistic fallacy likely stands as the crucial scientific and cultural limitation in exploring other forms of life on planet Earth. This talk will chart the biochemical space to be navigated through directed evolution as well as the scientific, industrial and cultural opportunities, challenges and risks associated with the emergence of an artificial biodiversity.

### Philippe MARLIÈRE

Isthmus, France

Dr. Philippe Marlière is a scientific designer and entrepreneur. From 1987 to 1999 he was a group leader at the Institute Pasteur, pioneering the development of synthetic biology. He co-founded several companies, in 2000 Evologic SA (enzymatic conversions), in 2005 Isthmus SARL, in 2007 Heurisko USA Inc. (genetic selections for industrial micro-organisms), in 2008 Global Bioenergies SA (bio-production of gaseous hydrocarbons), and in 2010 Alderys SAS (production of essential nutrients). Marlière also engages in public dialogue activities about technological innovation as a means to reach a sustainable, safe and equitable economy. He also acts as advisor to the Life Science Division of CEA.



17:00 - 18:30 / NHM

## HOMO AESTHETICUS:

### LIFE AS MEDIUM FOR ARTISTIC EXPRESSION

Moderator: Günter SEYFRIED

- Jens HAUSER:

'The new Green'? Art between Synthetic Biology and Biohacking

★ - Richard PELL:

That was Then... This is Now: Recent Developments in Postnatural History  
(with art exhibit)

★ - Herwig WEISER:

Phantom Lucid Messenger  
(with art exhibit)

- Erich BERGER:

HYBRID MATTERS

- Anna DUMITRIU:

Trust Me, I'm an Artist - Towards an Ethics of Art and Science Collaborations

THUR 23/10/14  
17:00 - 18:30 / NHM  
HOMO AESTHETICUS:  
LIFE AS MEDIUM FOR ARTISTIC EXPRESSION



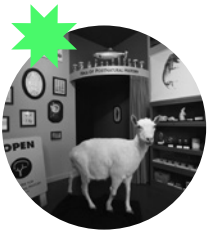
## 'The new Green'? Art between Synthetic Biology and Biohacking

The creation of lifelike appearances is an ever-recurring historical feature in art. By means of form, material or process, a touch of aliveness is staged, ideally favouring an empathic mind-set to bolster reception, aiming at involving the viewer viscerally. Contemporary artists who employ biotechnology are particularly 'close to life', and the discipline of Synthetic Biology is particularly well suited to upgrade art historical paradigms of 'creation'. In parallel, the democratization of lab tools leads to their appropriation by tinkerers and tactical media activists who apply the critical potential of open source culture from the digital age of Media Art to DIY biology and biohacking. This paper discusses the notion of media adequacy with regards to materials and strategies today, as DIY biology seems to become the next pop culture, and the 'happy hacker' is preferred to the 'evil engineer'.

### Jens HAUSER

Univ. of Copenhagen, Department of Arts and Cultural Studies & Medical Museion, Denmark

Jens Hauser is a Paris and Copenhagen based art curator and media studies scholar focusing on the interactions between art and technology in general, and on biomediality in particular. He is currently holding a postdoc research position both at the Department of Arts and Cultural Studies and at the Medical Museion/Faculty of Health Sciences at the University of Copenhagen. He has curated exhibitions such as L'Art Bio-tech (Nantes, 2003), Still, Living (Perth, 2007), sk-interfaces (Liverpool, 2008/Luxembourg, 2009), the Article Biennale (Stavanger, 2008), Transbiotics (Riga 2010), Fingerprints... (Berlin, 2011/Munich/2012) and Synth-ethic (Wien, 2011).



★ with art exhibit

## That was Then... This is Now: Recent Developments in Postnatural History

PostNatural History refers to the living organisms that have been intentionally and heritably altered by humans through breeding and genetic engineering. While these organisms are given marginal billing in natural history collections, The Center for PostNatural History presents them as cultural works that are open to interpretation. Using specimens and artifacts from the collection of the Center for PostNatural History, Richard Pell will discuss the pre-history of synthetic biology as well as recent developments in postnatural history.

### Richard PELL

The Center for PostNatural History,  
USA

The Center for PostNatural History (CPNH) is dedicated to the collection, documentation and exhibition of living organisms that have been intentionally and heritably altered by human beings through processes such as domestication, selective breeding and genetic engineering. The CPNH operates a permanent museum in Pittsburgh, Pennsylvania as well as touring exhibitions in the United States and Europe. The CPNH has been awarded support from Creative Capital, The Kindle Project, The Waag Society, The Smithsonian Artist Research Fellowship and The Rockefeller ReNew Media Fellowship.

THUR 23/10/14  
17:00 - 18:30 / NHM  
HOMO AESTHETICUS:  
LIFE AS MEDIUM FOR ARTISTIC EXPRESSION

★ with art exhibit

## Phantom Lucid Messenger

Lucid Phantom Messenger by Austrian artist Herwig Weiser consists both of a live biochemical experiment and its cinematographic restitution in which life-like forms emerge out of our waste of the digital era. Here, recycled substances derived from computer hardware trash are fed into a contained wetware system where they mix in an oily milieu and express complex processes and forms, not unlike a crystal garden. In the light of today's Synthetic Biology, the piece represents a thoughtful link to experiments

driven by French natural scientist Stéphane Leduc who coined the term "Biologie Synthétique" as early as in 1910, attempting to understand and build life from basic physical and chemical principles. Lucid Phantom Messenger juxtaposes the rational teleological engineering approach with the unpredictable evolutionary processes in biology. In Weiser's artwork, the strict control with electrodes and pumps contrast with the chaotic fluidic forms it induces. Lucid Phantom Messenger reminds us in a sophisticated aesthetic play that the deployment of a highly rational system may indeed result in the emergence of unpredictable and even hypnotic patterns.

### Herwig WEISER

Independent Artist, Austria

In his films and many other works Herwig Weiser undermines rational filters, interrogates modes of thinking and common meanings in our relation to technology. Instead of documenting reality, the works seek to trigger uncontrolled stream of consciousness, unanticipated reactions, uncertain consequences, in which, in the artist's words, "media got drugged." He studied at the Gerrit Rietveld Academie Amsterdam (1992-94) and graduated from the Academy of Media Arts Cologne in 1998. Weiser focuses on the analogue materiality of the digital machinery that he is reworking and rethinking in his projects. Thus, for example, Weiser transforms a computer into a living organism - 'functioning' or evolving as an unpredictable and unstable system - logic in reverse. His projects are the result of close collaborations with both scientists and musicians, always aiming to provoke powerful sensual experiences while simultaneously evoking the strong correspondence between art and science or film and performance





## HYBRID MATTERS

The Finnish Society of Bioart is an organisation fostering collaborations between art and natural science with a focus on ecology, biology and biotechnology. The diverse activities ranging from artistic field work in the subarctic Lapland to interdisciplinary research platforms on synthetic biology are motivated by the examination of our environment as hybrid ecology. Hybrid ecology constitutes itself as a merger of the technologically informed physical environment with the digital environment. Hybrid ecology enfolds through the manifold conventional and digital interactions of its elements and actors. Actors include humans and non-humans, which can be of biological, biotechnological, machine, mineral or hybrid nature. <http://bioartsociety.fi>

### Erich BERGER

Finish Bioart Society, Finland

Erich Berger is an artist and cultural worker based in Helsinki/Finland. His interests lie in information processes and feedback structures, which he investigates through installations, situations, performances and interfaces. His current explorations of deep time and hybrid ecology led him to work with geological processes, radiogenic phenomena and their socio-political implications in the here and now. Berger is directing the Finnish Society of Bioart and is a lecturer at the Fine Art Academy Vienna.

<http://randomseed.org>



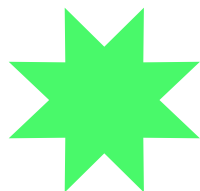
## Trust Me, I'm an Artist - Towards an Ethics of Art and Science Collaboration

"Trust Me, I'm an Artist: Towards an Ethics of Art and Science Collaboration" is a project and new book by Anna Dumitriu and Professor Bobbie Farsides, which investigates novel ethical issues arising through art and science collaboration and considers the roles and responsibilities of the artists, scientists and institutions involved. The project focusses on bioart or biomedical art and features projects by Adam Zaretsky, Neal White, Art Orienté objet, and Anna Dumitriu herself. Dumitriu proposed to build a containment level 2 bacteriology lab in an art gallery to enable the public to work hands on with pathogenic bacteria in a supervised setting as well as widening participation in DIY microbiology techniques. A progression of "Trust Me, I'm an Artist" was recently funded by the Creative Europe programme and will take place over the next two years. <http://www.artscienceethics.com>

### Anna DUMITRIU

Independent artist, Institute of Unnecessary Research, UK

Anna Dumitriu's work is at the forefront of art and microbiology collaboration, with a strong interest in the ethical impact of emerging technologies. Her installations, interventions and performances use a range of digital, biological and traditional media including live bacteria, and are regularly exhibited internationally. She is Artist in Residence on the Modernising Medical Microbiology Project at The University of Oxford and won the 2012 Society for Applied Microbiology Communication Award. Her major Wellcome Trust funded project "The Romantic Disease: An Artistic Investigation of Tuberculosis" is currently on show at Art Laboratory Berlin as part of a solo retrospective.



19:45 - 21:00 / Narrenturm

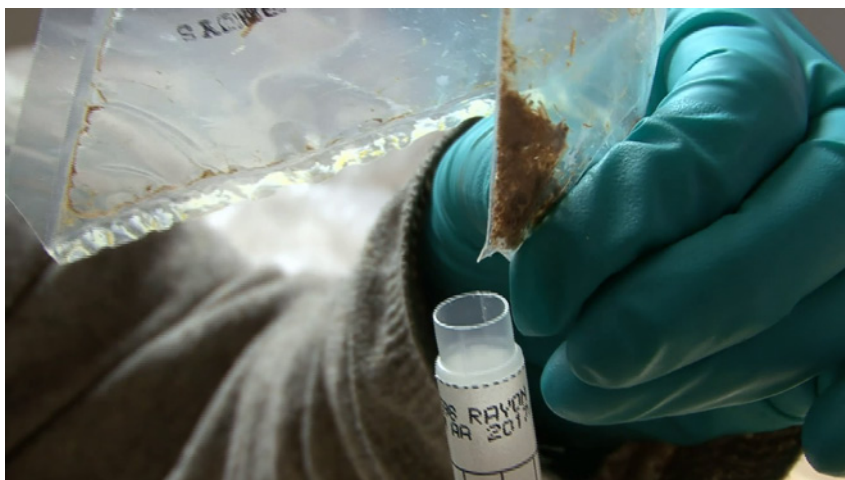
21:15 - 22:30 / Narrenturm

## PERFORMANCE: HARE'S BLOOD+

Registration required, please email [registration@bio-fiction.com](mailto:registration@bio-fiction.com).

45 people max. per time slot.

Klaus SPIESS (Medical University Vienna, Austria) and  
Lucie STRECKER (Performance Artist and Scenographer, Germany)



Klaus Spiess (Art and Science Director) Lucie Strecker (Artistic Director)

Co-choreography: Costas Kekis. Performers: Costas Kekis, Raphael Michon, Ivandro Pedroni.

Programming and Visual Media: Norbert Unfug, Antony Rajekov. Molecular Biology: Markus Hofer, Reinhard Nestelbacher, Lore Breitenbach-Koller, Karl Kuchler (Video).

THUR 23/10/14  
19:45 - 21:00 / Narrenturm  
21:15 - 22:30 / Narrenturm  
PERFORMANCE: HARE'S BLOOD+

## HARE'S BLOOD+

Previously, artists have often incorporated dead animals in their art-work in order to provoke an ethical, biopolitical and interspecies discourse. In contrast, in processing information on its commercial and genetic significance "Hare's Blood+" in itself produces liveness.

Klaus Spiess and Lucie Strecker transfer part of the genome from Joseph Beuys' multiple "Hare's Blood" into living cells. With a biosensor these transgenic cells now recognize the auction values of Beuys' multiple "Hare's Blood" as well as the trading values for livestock on the stock exchange. A biobrick, specifically designed from the hare's genome, stops cell growth if the relation between auction values and livestock trades on the stock exchange conflicts with Joseph Beuys' idea of free-trade.

The artists consider concepts of 'living money' when the artwork is consigned to its "collectors" in a performative auction. This performative artwork with its different thresholds of liveness rejects definite property rights over a "biobanked" animal in art and suggests a living and autopoietically learning ontological substance.



## Klaus SPIESS

Medical University Vienna, Austria

Klaus Spiess specializes in endocrinology, medical anthropology, psychoanalysis and medical performance. He works as an associate professor at Vienna Medical University (Arts in Medicine Group, Center for Public Health) and has recently been cooperating with Lucie Strecker in the collective "Bios:Zoe".

Works by both of them have been presented at the Tate Modern, the Kunstforum International, Haus der Kulturen der Welt Berlin, Tanzquartier Vienna, Budascoop Kortrijk, published by Kunstforum International, Performance Research, Diaphanes Publisher and have received awards from the Austrian Science Fund and Performing Science Gießen.

## Lucie STRECKER

Performance Artist and  
Scenographer, Germany

Lucie Strecker is an artist, performer and fellow at the University of the Arts, Berlin. She has recently been cooperating with Klaus Spiess in the collective "Bios:Zoe". Works by both of them have been presented at the Tate Modern, the Kunstforum International, Haus der Kulturen der Welt Berlin, Tanzquartier Vienna, Budascoop Kortrijk, published by Kunstforum International, Performance Research, Diaphanes Publisher and have received awards from the Austrian Science Fund and Performing Science Gießen.

# FRI

## 24/10/14

9:00 - 10:30 / NHM

### ● HOMO SOCIETATIS: RESPONSIBLE RESEARCH AND INNOVATION (RRI) P 28

Moderator: Christopher COENEN

- Sheref MANSY: Integrating Artificial with Natural Cells
- Virgil RERIMASSIE: SynBio Politics: Bringing a Synthetic Biology into Debate in the Netherlands
- Erwin RICHTER: Bioweapons and Biosecurity
- Karen KASTENHOFER: The Power of Framing in Technology Governance
- Jordi MAISO: Addressing the Ethical Issues of Synthetic Biology

10:30 - 11:00 / NHM

### COFFEE BREAK & INTERACTION ☕

11:00 - 12:30 / NHM

### ● HOMO COMMUNIS: DO-IT-YOURSELF BIOLOGY P 34

Moderator: Jens HAUSER

- Ilya LEVANTIS: London Biohackspace: Growing Cellulose, Growing potential
- Philipp BOEING: bento-lab
- Thomas LANDRAIN: Is Biohacking the Future of Biology?
- Pieter VAN BOHEEMEN: From Tinkering to Trading: Amplino's Frugal Health Care Innovation
- Günter SEYFRIED, Lucas CZJZEK, Niki PASSATH: Yeastograms

- ★ - Opening of DIYbio Demo Tables (hands on interactive demos)

12:30 - 13:30 / NHM

### LUNCH & DIYBIO DEMOS ☕

13:30 - 14:30 / NHM

### ● HOMO OECONOMICUS: INNOVATION AS RATIONAL BEHAVIOUR? P.40

Moderator: Vitor MARTINS DOS SANTOS

- Vincenzo PAVONE: Synthetic Life, Neoliberal Society: Biopolitics in the XXI Century
- Nadine BONGAERTS: Hello Tomorrow: A European Technology & Entrepreneurship Competition
- x Panel discussion with Vincenzo PAVONE, Nadine BONGAERTS, Lucie STRECKER and Klaus SPIESS

14:30 - 15:30 / NHM

### ● HOMO PATIENS: THE ANTIBIOTIC RESISTANCE THREAT P.44

Moderator: Wolfgang KERBE

- Sven PANKE: A Combinatorial Approach to Design Novel Antibiotics
- Anna DUMITRIU: The MRSA Quilt
- Rüdiger TROJOK: BioStrike - Open Antibiotics Discovery
- x Panel discussion with Sven PANKE, Anna DUMITRU, Rüdiger TROJOK

15:30 - 16:00 / NHM

### COFFEE BREAK & INTERACTION ☕

16:00 - 18:15 / NHM

### ● HOMO CULTURALIS: SCIENCE IN FILM P.48

Moderator: Laurens LANDEWEERD

- David KIRBY: Science on the Silver Screen: Scientists' Impact on Cinema, Cinema's Influence on Science
- Katherina T. ZAKRAVSKY: Dark Star Dystopia - From the Sad Tropes of Technology in Seventies Science Fiction Cinema to the Dawn of Decomponautics
- x Panel discussion with David KIRBY, Katharina T. ZAKRAVSKY, Kristina KORSHOLM and Steen RASMUSSEN

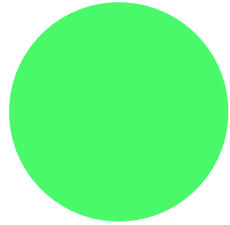
20:00 - 21:30 / BELLARIA CINEMA

### ▶ FILM SCREENING: FICTION NARRATIVE

21:45 - 22:30 / BELLARIA CINEMA

### ▶ FILM SCREENING: ANIMATION





9:00 - 10:30 / NHM

## HOMO SOCIETATIS: RESPONSIBLE RESEARCH AND INNOVATION (RRI)

Moderator: Christopher COENEN

- Sheref MANSY:  
Integrating Artificial with Natural Cells
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The Power of Framing in Technology Governance
- Jordi MAISO:  
Addressing the Ethical Issues of Synthetic Biology

FRI 24/10/14  
9:00 - 10:30 / NHM  
HOMO SOCIETATIS:  
RESPONSIBLE RESEARCH AND INNOVATION (RRI)



### Integrating Artificial with Natural Cells

All living things communicate. Chemical signals that are sensed and sent out modify the behavior of individual organisms and the community as a whole. Therefore, if artificial cells were built that speak the same chemical language as natural cells, it should be possible to control the behavior of the natural cells. We describe our recent efforts in constructing such a system.

#### Sheref MANSY

University of Trento, CIBIO, Italy

Sheref MANSY grew up in the great state of Ohio. His BS and PhD degrees are from Ohio State University where he worked with J. A. Cowan on Fe-S biosynthesis. He then explored the origins of life as a NIH postdoctoral fellow in the laboratory of J. W. Szostak at Harvard/MGH. After receiving an Armenise-Harvard career development award, Sheref setup a laboratory in the beautiful Trentino mountains of Italy. His laboratory currently investigates prebiotic Fe-S peptides and builds artificial cells from scratch. He is a 2012 TEDGlobal Fellow.





## SynBio Politics: Bringing a Synthetic Biology into Debate in the Netherlands

In order to promote the proper societal embedding of synthetic biology, the Rathenau Instituut has been actively involved in stimulating dialogue on the emerging field since 2006. One of the efforts was organizing a 'Meeting of Young Minds' in 2011: a youth debate between 'future synthetic biologists and future politicians'. The former were represented by participants of the international Genetically Engineered Machines competition (iGEM), the latter by political youth organizations (PYOs), linked to Dutch political parties. The Rathenau Instituut found seven PYOs – varying from rightwing to leftwing and green to Christian – willing to commit to an intensive process aimed at formulating a tentative partisan opinion on synthetic biology and defending it amongst fellow PYOs and iGEM participants. Given the little amount of available data on how political parties gauge synthetic biology, an analysis of the debate may contribute to the understanding of where potential political sensibilities and concerns may arise.

**Virgil RERIMASSIE**  
Rathenau Institute, Netherlands

Virgil Rerimassie (1986) is working as a researcher at the Technology Assessment department of the Rathenau Instituut, based in the Netherlands. He has been involved in several projects dedicated to analyzing the ethical, legal and social impact of synthetic biology and enjoys organizing and hosting public and political debates on hereon. Virgil holds master's degrees in Constitutional and Administrative Law and in Science & Technology Studies. During his studies he worked as a legal counselor at the Dutch Council for Refugees. Before starting at the Rathenau Instituut, Virgil worked at the Dutch Ministry for Housing, Spatial Planning and Environmental Affairs.



## Bioweapons and Biosecurity

Biological weapons (BW) pose a horrifying threat to the world in general. The elder history of BW ended with World War I, since the period between the two world wars scientific research on BW grew up and increased with modern biological methods. Since nuclear weapons are strongly limited and chemical weapons are in the process of eradicating, BW remain as a category of weapons of mass destruction affecting people, animals and plants. The Biological Weapons Convention (BWC, set into force since 1972) was the first multilateral disarmament treaty trying to forbid possession and use of BW completely. The convention turned out to be ineffective by missing its own international organization and an effective verification system. There are two main ways to strengthen the BWC for the future: the implementation of a verification mechanism and/or improving confidence building measures to gain better biosecurity in future.

**Erwin RICHTER**  
Österreichisches Bundesheer –  
ABC Abwehrschule, Austria

Erwin Richter, MA, Lieutenant Colonel, Deputy Section Head of the Development & Training Department/NBC-Defense School in the Austrian Armed Forces; Analyst of CBRN-threats; Master in political science, Post graduate training in the Austrian Research Institute Seibersdorf. Former UN bioweapons inspector with UNSCOM/UNMOVIC in Iraq. Special CBRN-trainings in Switzerland, Germany, USA and within the UN.



## The Power of Framing in Technology Governance

Systems and synthetic biology both emerged as new research fields around the turn of the century. Although their disciplinary status as well as their relation to each other is rarely discussed in depth, the idea is invoked that both approaches represent “two sides of the same coin”. I will focus on this general framing and compare it with empirical findings concerning the epistemic cultures prevalent in the two contexts.

If systems and synthetic biology represent “two sides of the same coin”, then the coin we are talking about bears many resemblances with what has been labelled as technoscience. It relates to a general discursive conflation of understanding, control, construction and creation. But although both fields result in understanding as well as construction, what is understood and what is constructed can differ significantly. Such discursive conflations and practical (re-)differentiations have important consequences for the conceptualisation of responsible research and its governance.

### Karen KASTENHOFER

Austrian Academy of Science – Institute of Technology Assessment, Austria

Karen Kastenhofer is a scholar in Science and Technology Studies (STS) and holds a PhD in biology. Her area of work encompasses the reconstruction of (techno)epistemic cultures, the analysis of public controversies and the discussion of potential governance approaches in the realm of the life sciences and biotechnologies. She is situated at the Institute of Technology Assessment (ITA) of the Austrian Academy of Sciences in Vienna.



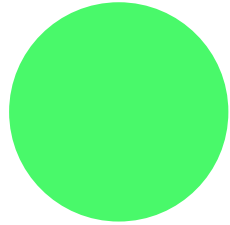
## Addressing the Ethical Issues of Synthetic Biology

Synthetic Biology is emerging as a promising field mobilizing big expectations and remarkable investments. Its purpose is the fabrication of made-to-measure biological systems which might enable a successful combination of economic growth and sustainability. But SynBio does not only open up promising opportunities, it also involves uncertainties and risks. In order to deal with them, not only legal, safety and security issues are being addressed, but also the ethical dimensions of the very attempt of engineering life. As an element for the governance of the new field, the ethical discussion mainly focuses on how ‘bioengineering’ might affect our understanding of life. Nevertheless, the ethical implications of SynBio do not only concern its possible impacts, but are also rooted in the very assumptions of the project of ‘bioengineering’. Therefore the need to set the ethical discussion in a wider framework: what is the implicit understanding of the connections between research, innovation, society and life in the SynBio agenda?

### Jordi MAISO

Inst. of Philosophy - Center for Human and Social Sciences - CSIC, Spain

Jordi Maiso is Research Fellow at the Institute of Philosophy in the Center for Human and Social Sciences of the Spanish National Research Council (CSIC). He got his PhD in philosophy at the University of Salamanca (Spain) and he has been a postdoc Research Grant holder at the Free University of Berlin (DAAD) and the Center for the Research of Anti-Semitism (Technical University of Berlin). His research focuses mainly in social philosophy, critical social theory, and ethical and political issues of synthetic biology.



11:00 - 12:30 / NHM

## HOMO COMMUNIS: DO-IT-YOURSELF BIOLOGY

Moderator: Jens HAUSER

- Ilya LEVANTIS:  
London Biohackspace: Growing Cellulose, Growing potential
- Philipp BOEING:  
bento-lab
- Thomas LANDRAIN:  
Is Biohacking the Future of Biology?
- Pieter VAN BOHEEMEN:  
From Tinkering to Trading: Amplino's Frugal Health Care Innovation
- Günter SEYFRIED, Lucas CZJZEK, Niki PASSATH:  
Yeastograms
- ★ - Opening of DIYbio Demo Tables (hands-on interactive demos):
  - JuicyPrint (London Biohackspace)
  - bento-lab (UCL)
  - Grow Your Ink (La Pailasse)
  - Amplino (Waag Society/Amplino)
  - Yeastograms (Pavillon 35)

FRI 24/10/14  
11:00 - 12:30 / NHM  
HOMO COMMUNIS: DO-IT-YOURSELF BIOLOGY



## London Biohackspace: Growing Cellulose, Growing potential

London Biohackspace is a non-profit community biology lab based in the London Hackspace, in Hackney, East London. Our lab provides the space and equipment for a diverse group of experts and newcomers alike to create inventive projects. Over the past year, we have been focusing on improving the lab with better equipment and improving the infrastructure of London Biohackspace in an effort to enable a greater range of projects. Our current focus is obtaining CL1 status for the lab. This year we have also entered the iGEM competition with our project: JuicyPrint, a 3D printer that is fed with fruit juice to print on demand 3D structures of bacterial cellulose. Not only will JuicyPrint show what is possible in a community lab, but it will also have diverse uses across fields ranging from tissue engineering to textile design and experimental arts.

**Ilya LEVANTIS**  
London Biohackspace

After graduating from Oxford University with a bachelor degree in biological sciences in June 2013, I quickly became involved in the London Biohackspace. My reluctance to immediately pursue further academic study, but to remain connected to the world of science, lead me to the DIYbio community. So whilst working at a start-up law firm doing IT work, the Biohackspace provided an outlet for my interest in science and the chance to collaborate with a fascinating diversity of people. I am currently focusing on creating more collaborations between Universities and DIYbio spaces.



## bento-lab

bento-lab is a powerful, personal laboratory in a laptop-sized format. We aim to enable scientists, DIYbiologists, artists and all curious minds to engage with biology and biotechnology any place and any time.

Find out more on [www.bento.bio](http://www.bento.bio)

## Philipp BOEING

University College London/Darwin

In addition to building bento-lab, Philipp Boeing is involved in iGEM, citizen science and DIYbio. He researches synthetic biology design automation at UCL, and you can follow him @PhilippBoeing.



## Is Biohacking the Future of Biology?

The Do-it-yourself Biology (DIYbio) community is emerging as a movement that fosters open access to resources permitting modern molecular biology, and synthetic biology among others. It promises in particular to be a source of cheaper and simpler solutions for environmental monitoring, personal diagnostic and the use of biomaterials. The successful growth of a global community of DIYbio practitioners will depend largely on enabling safe access to state-of-the-art molecular biology tools and resources. In this talk I'll analyze the rise of DIYbio, its community, its material resources and its applications, by taking as an example La Paillasse, one of the largest biohackerspaces in Europe.

## Thomas LANDRAIN

La Paillasse, France

Thomas is the co-founder and president of the nonprofit organization "La Paillasse" in Paris, one of the world's largest community laboratories, commonly called hackerspaces, that foster open access and open source biotechnologies. He is an active member of the Do-it-yourself Biology (DIYbio) community, organizing the launch of DIYbio Europe, and working regularly as one of its spokespersons. Convinced that the 21st century will be the century of biotechnologies, he has been focusing on making biology more accessible to use as a technology for citizens and amateurs, developing cheap genetic diagnostics and creative use of biomaterials. He is currently finishing his Synthetic Biology PhD studies at ISSB, a CNRS-Genopole research institution.



## From Tinkering to Trading: Amplino's Frugal Health Care Innovation

Can DIYBio save the world? Community biolabs, such as Waag Society's Open Wetlab, attract people with such diversity in skills and backgrounds that innovative ideas and prototypes almost emerge naturally. It almost seems like in the context of the hackspace traditional constraints of transforming imagination into reality do not exist. Not hindered by marketing, distribution and business plans. Instead driven by passion, perseverance and creativity. The remaining economic pressure is converted to smarter (re)use of materials and resources, giving rise to a unique mixture of social digital culture and frugal innovation.

Amplino's Scout point-of-care malaria diagnostic device was developed at the kitchen table. We reduced the complexity of quantitative PCR devices to an assembly of open source programmable microcontrollers and off-the-shelf components. In this presentation I will show we applied this same hacking mentality to doing business and how far we got up to now.

**Pieter VAN BOHEEMEN**

Waag Society/Amplino, Netherlands

At Waag Society's Open Wetlab, Pieter van Boheemen develops projects, conducts research and leads workshops intertwining biotechnology, open innovation and arts. As founder of the Dutch DIY Bio community in 2012, he started a group of grassroots biotechnologists. His main interest is investigating social and cultural innovation through the intertwining of open source hardware/software/wetware applied to synthetic biology, systems biology and bio informatics.

Pieter van Boheemen has a master degree in biotechnology of the Delft University of Technology. He is a former ICT entrepreneur and co-founder of online retail shops. Currently he is cofounder of the molecular diagnostics company Amplino.

FRI 24/10/14  
11:00 - 12:30 / NHM  
[HOMO COMMUNIS: DO-IT-YOURSELF BIOLOGY](#)



## Yeastograms

In the workshop Yeastograms the Bioart Club pavillon\_35 is showing a method to cultivate baker's yeast and how to shape the cultivation according to aesthetic and artistic decisions. The workshop explores the use of living organisms in artistic formation and expression using amateur-biological techniques.

<http://pavillon35.polycinease.com>  
<http://yeastogram.com>

**Günter SEYFRIED**

Pavillon 35, Austria

Günter Seyfried has a background in medicine and psychology, having studied at the University of Vienna and has strong links to fine art, digital art and media art, having graduated from the University of Applied Arts Vienna (Department of Digital Art). He works part time at the University of Applied Arts Vienna, Department of Art and Knowledge Transfer, teaching philosophy and art theory. He combines scientific and artistic education through an active involvement in a number of highly respected projects (field research, art-based research, art exhibitions, book publications). He created a number of works and developed projects as an independent artist participating in national and international exhibitions and publications.

**Niki PASSATH**

Pavillon 35, Austria

Niki Passath is engaged in his work with the relationships between man, machine and the surrounding nature. Born 1977 in Graz, he lives and works in Vienna and teaches at the University for Applied Arts in Vienna. Niki Passath studied "Violoncello", "Architecture" and graduated in "Digital Art".

**Lucas CZJZEK**

Pavillon 35, Austria

Lucas Czjzek studied Digital Arts at the University of Applied Arts Vienna and took residencies in Berlin and California. Lucas has experience as high-end chocolatier and works as a video producer for VICE. Since January 2013 artistic works with biological materials. His work Anima 1.0 was exhibited at Künstlerhaus, Quartier 21 and das Weiße Haus in Vienna. Lucas held yeast printing workshops at Cynetart in Dresden and Finish Bioart Society in Helsinki.



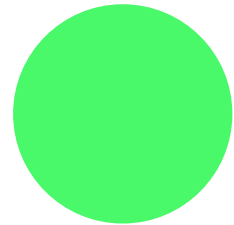
## Synthetic Life, Neoliberal Society: Biopolitics in the XXI Century

Synthetic biology brings together biotechnology, bio-informatics and genetic engineering. New DNA sequences are assembled to the point where simple unicellular synthetic organisms can be brought to life. As these new organisms could be engineered to fight contamination, operate as biosensors or work as biological circuits, synthetic life has become a new, and promising technological solution to the many problems affecting the planet. Many criticisms have been raised about the inherent risk of bringing to life cell organisms whose functions may not be clearly identified beforehand, but less attention has been devoted to the type of traits and coding functions that are being engineered. Though presented through the language of science, the synthetic life project adopts the language of politics in the subtitles. Engineering synthetic life is as much about re-fashioning society as it is about manipulating nature. Here, I will show how engineering synthetic life is a new, powerful, way to foster a neoliberal approach to sustainable growth.

### Vincenzo PAVONE

Institute of Public Goods and Policies, CSIC, Spain

Vincenzo Pavone (M) is Permanent Research Fellow at the Institute of Public Policies of the High Research Council in Spain (CSIC), and member of the SPRI Research Group. His area of expertise is science and technology studies, and his research specifically addresses public engagement and public assessment of science and technology as well as the ethical, social and legal aspects of emerging technologies. He is especially interested in the relationship between neoliberal modes of knowledge production and the emergence of new bioeconomies. More specifically, he is interested in how medical, agricultural (GMOs and Cisgenics) and security biotechnologies reflect and shape social and political changes associated with very different policy areas such as health policy, food and environmental policies as well as security policies. In the field of research and innovation studies, he has been recently advancing a comprehensive study of the reproductive bioeconomy (2010) and of the relationship between the EU and the OECD Bioeconomy strategies and neoliberal policies of research and innovation (In press 2014).



13:30 - 14:30 / NHM

## HOMO Oeconomicus: Innovation as Rational Behaviour?

Moderator: Vitor MARTINS DOS SANTOS

- Vincenzo PAVONE:

Synthetic Life, Neoliberal Society: Biopolitics in the XXI Century

- Nadine BONGAERTS:

Hello Tomorrow: A European Technology & Entrepreneurship Competition

x Panel discussion

with Vincenzo PAVONE, Nadine BONGAERTS, Lucie STRECKER and Klaus SPIESS





## Hello Tomorrow: A European Technology & Entrepreneurship Competition

Hello Tomorrow started as a grand European competition and conference for technology & entrepreneurship in April 2014; it is now expanding on a worldwide basis.

Hello Tomorrow's mission as a global initiative is to accelerate innovation by removing the barriers between research, design and business fields. In support of this mission, Hello Tomorrow set up a competition, conference and community where engineers, students, investors, scientists, designers, policy makers are stimulated to exchange knowledge and collaborate on finding revolutionary applications to new technologies.

### Nadine BONGAERTS

Hello Tomorrow/Kairos Foundation, Netherlands

Nadine Bongaerts is the Global Community Director of Hello Tomorrow, Dutch Chair of the Kairos Society and co-owner of Biotecture. She has an academic background in biotechnology (Delft University of Technology) and is a strong connector between science, business and society. In 2011, she co-founded Biotecture to enhance the public awareness and understanding of life science developments. As the Dutch chair of the Kairos Society, she supports young entrepreneurs to accelerate the path to market of their businesses and to build international relationships. Her recent position in the Hello Tomorrow organization allows her to remove the barriers between the academic and business fields, stimulate innovative entrepreneurship and build interdisciplinary bridges worldwide.

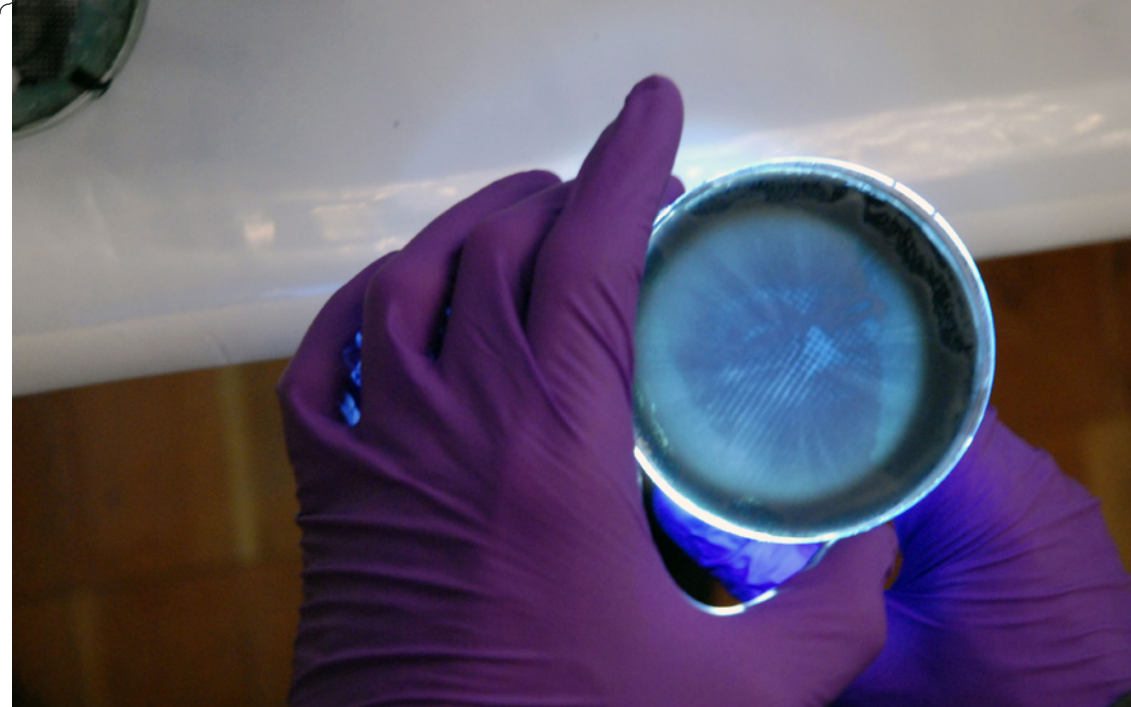
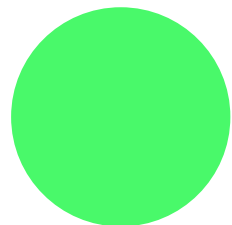


Image by pavillon\_35 - Günter Seyfried, Lucas Czjzek, Niki Passath (page 39)





14:30 - 15:30 / NHM

## HOMO PATIENS: THE ANTIBIOTIC RESISTANCE THREAT

Moderator: Wolfgang KERBE

- Sven PANKE:  
A Combinatorial Approach to Design Novel Antibiotics
  - Anna DUMITRU:  
The MRSA Quilt
  - Rüdiger TROJOK:  
BioStrike - Open Antibiotics Discovery
- x Panel discussion  
with Sven PANKE, Anna DUMITRIU, Rüdiger TROJOK

FRI 24/10/14  
14:30 - 15:30 / NHM  
HOMO PATIENS: THE ANTIBIOTIC RESISTANCE THREAT



### A Combinatorial Approach to Design Novel Antibiotics

The elimination of bacterial infection as major cause of human death in many parts of the world is one of the major achievements of mankind in the last century. This dramatic achievement is increasingly under threat, in particular because over the last decades bacteria that have become resistant against multiple antibiotics have appeared in hospitals across the world, including central Europe. This has re-intensified the search for novel antibiotic molecules. However, the old model of antibiotic discovery seems to no longer work as smoothly as it used to. Novel strategies are emerging. One of them relates to the fact that existing antibiotics might have functional “modules” that help them working efficiently as an antibiotic and that massively re-combining such modules might deliver novel molecules. This approach and the required massive development of novel technology is explored in the EU-project SYNPEPTIDE.

#### Sven PANKE

Bioprocess Laboratory D-BSSE - ETH Zuerich

Sven Panke is a Professor of Bioprocess Engineering at the ETH Zurich. After his PhD, also at ETHZ, he worked for two years biocatalysis group of the Dutch chemical company DSM (Geleen, The Netherlands). He returned to ETH in 2001 as an Assistant Professor. Received tenure in 2007, and then moved to the newly founded ETHZ Department of Biosystems Science and Engineering in Basel. His main research topics include integrated reaction-separation systems, high-throughput screening, and synthetic biology. His work was awarded with the ETH Medal and the DSM Research Award.



## The MRSA Quilt

"The MRSA Quilt" was created by embedding squares of cotton calico in chromogenic agar. This bacterial growth medium contains a dye that is taken up by *Staphylococcus aureus* bacteria, causing them to grow blue in colour and stain the calico. The patterns on the quilt squares are created using various tools and techniques in the treatment and diagnosis of infections caused by this bacterium and its drug resistant form, known as MRSA (Methicillin or Multi drug resistant *Staphylococcus aureus*). These patterns include stripes and polka dots created using antibiotic susceptibility tests, as well as embroideries made using thread dyed using natural antimicrobials such as turmeric or safflower. Dumitriu has led numerous participatory workshops, where members of the public can make their own DIY experiments with natural antimicrobials and bacteria to create quilt squares. Made in collaboration with Dr John Paul, Dr James Price, and biomedical scientist Kevin Cole.

<http://www.normalflora.co.uk>

### Anna DUMITRIU

Independent artist,  
Institute of Unnecessary Research, UK

Anna Dumitriu's work is at the forefront of art and microbiology collaboration, with a strong interest in the ethical impact of emerging technologies. Her installations, interventions and performances use a range of digital, biological and traditional media including live bacteria, and are regularly exhibited internationally. She is Artist in Residence on the Modernising Medical Microbiology Project at The University of Oxford and won the 2012 Society for Applied Microbiology Communication Award. Her major Wellcome Trust funded project "The Romantic Disease: An Artistic Investigation of Tuberculosis" is currently on show at Art Laboratory Berlin as part of a solo retrospective.



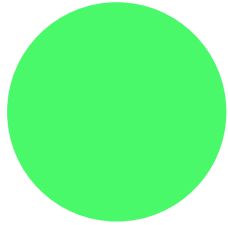
## BioStrike - Open Antibiotics Discovery

The overuse of available antibiotics and subsequent evolutionary pressure has led to the development of multi-resistant bacteria. The reason for an exacerbation of the antibiotics problem into an antibiotics crisis is a market failure due to a lack of financial incentives for the pharmaceutical industry to develop new drugs like antibiotics with a small profit margin. Citizens thought of possible scenarios of how to detect antibiotic substances from samples collected in the field. Citizens and scientists could participate within a global community BioStrike, collaborating to find new antibiotics. Specialists from all fields of expertise would put together their knowledge to build the tool sets – that is wetware, hardware and software – to enable decentralized research on antibiotics. Decentralizing the screening for antibiotics around the world could reduce the costs of research and increase the chances to discover new compounds, as citizens of a diverse range of countries have direct access to a wide variety of ecosystems and local knowledge around the globe.

### Rüdiger TROJOK

Karlsruhe Institute of Technology - ITAS, Germany

Rüdiger Trojok studied systems and synthetic biology at the University of Potsdam and the University of Freiburg in Germany and Denmark Technical University in Copenhagen and worked as a freelance consultant for the technology assessment office at the German Bundestag and is now a scholar at the Institute for Technology Assessment and Systems Analysis, Karlsruhe University (ITAS, KIT). There, he explores new ways to make the fruits of science available to a larger audience and to enable a molecular understanding of the relations of nature and civilization. Currently he is building up a citizen science biolab in Berlin and is actively promoting open source biotechnology in science, public, politics and the arts.



16:00 - 18:15 / NHM

## HOMO CULTURALIS: SCIENCE IN FILM

Moderator: Laurens LANDEWEERD

- David KIRBY:

Science on the Silver Screen: Scientists' Impact on Cinema, Cinema's Influence on Science

- Katherina T. ZAKRAVSKY:

Dark Star Dystopia - From the Sad Tropes of Technology in  
Seventies Science Fiction Cinema to the Dawn of Decononautics

x Panel discussion

with David KIRBY, Katharina T. ZAKRAVSKY, Kristina KORSHOLM and Steen RASMUSSEN

FRI 24/10/14  
16:00 - 18:15 / NHM  
HOMO CULTURALIS: SCIENCE IN FILM



### Science on the Silver Screen: Scientists' Impact on Cinema, Cinema's Influence on Science

Science has become a prominent feature in contemporary Hollywood cinema with several recent box office successes having science at their core. But, the scientific community has long standing concerns about cinema's impact on public attitudes towards science. In fact, there is significant evidence showing that movies can have a powerful influence on public perceptions of science. Anxiety over Hollywood science has led many scientists to become consultants for movie productions in order to influence how stories about science are told through this medium. In this talk I will elaborate on the backstage role scientific experts play in negotiating information transfer between the scientific community and the entertainment community. I will also discuss the constraints filmmakers face when attempting to incorporate science. In addition, I will explore the ways in which movies influence science itself including how movies promote research agendas, stimulate technological development, and impact the cultural meanings of science.

#### David KIRBY

Univ. of Manchester, Centre for the History of Science, Technology and Medicine, UK

David A. Kirby was a practicing evolutionary geneticist before leaving bench science to become Senior Lecturer in Science Communication Studies at the University of Manchester. Several of his publications address the relationship between cinema, biotechnology and cultural meanings. His book *Lab Coats in Hollywood: Science, Scientists and Cinema* examines collaborations between scientists and the entertainment industry. He recently received a Wellcome Trust Investigator Award to analyse the interactions among the biosciences, religion and fiction. His current book project (*Indecent Science: Religion, Science and Movie Censorship, 1930-1968*) will explore how movies served as a battleground over science's role in influencing morality.



## Dark Star Dystopia - From the Sad Tropes of Technology in Seventies Science Fiction Cinema to the Dawn of Decomponautics

It may puzzle the standard psychologist, but dystopia is fun. In all history of science fiction, no matter if literature, film, graphic novel or game, hardly any cult item can be found that is not profoundly dystopian. One reason for this diagnosis is the heroic quality of sublime aesthetics serving as a training's device for learning neuro- and socio-systems; another the moral necessity of warning the ruling powers about the escalating tendencies of the operational systems they set their idle hopes in. But what I am specifically interested in is the quality of dystopia as a matrix (pun intended) of a collective work of mourning our previous crimes and mistakes in the realm of science and technology that is the only way to come to a better practice.

### Katherina T. ZAKRAVSKY

Independent scholar of science and society, writer, performance and concept artist, developer, Austria

Independent Scholar of Science and Society, writer, performance and concept artist, developer. Studies of German philology and philosophy in Vienna, Dissertation on Immanuel Kant's theory of the university and system theory (1999); (1995-2012) Teaching at various Austrian universities; 2013 Game Show at the Kunsthalle Wien (with Andrea Hubin) "Salon Imaginaire"; Since 2012 independent scholar and artist working on topics of bioethics, neuro-culture, biology, evolutionary and systems theory, STS, socio-pathology, fan and pop culture, science fiction, film and media theory, trans/humanism, post-feminism, post-porn and transgender and gender theory and practice. Latest publication: Omega Surfing. Zu Biopolitik, Science Fiction und Pornografie. Löcker 2012.

### Kristina KORSHOLM

Actress and filmmaker



Kristina Korsholm has a degree in Film and Media from Copenhagen University, and a degree in journalism from University of Stockholm. Currently, she is working on the feature length documentary "Daughter Cell", which tells a story about artificial life and about her father, the well known scientist Steen Rasmussen. Kristina is known for her work as an actress and international model. She just wrapped the European TV show, THE TEAM (airing in 2015), was the lead in Sedona's Rule (2010), The Killing of a Danish Swan (2011) and has been on several award winning television shows. She has also published two books, the latest "NYC - Head over High Heels".

[www.kristinakorsholm.com/](http://www.kristinakorsholm.com/)

### Steen RASMUSSEN

University of Southern Denmark -  
Fundamental Living Technology FLinT, Denmark



Professor in Physics & Center Director, University of Southern Denmark & External Research Professor, Santa Fe Institute, USA. 20 years (1988-2007) in the USA as a research leader at Los Alamos National Laboratory. Honors include P. Gorm-Petersens Mindelegat in the presence of Her Majesty the Queen, Magrethe II of Denmark (1988) & World Technology Network Reward, San Francisco (2005). Won \$35+ million in research grants to home institutions and consortia. Published 100+ peer reviewed papers, edited five books, 200+ invited presentations, 100+ media interviews including Wall Street Journal and New York Times. Three adult children. Lives at a farm by the sea.

# SAT

## 25/10/14

9:00 - 12:30 / BELLARIA CINEMA

CINEMA BREAKFAST ☕

9:00 - 9:55 / BELLARIA CINEMA

▶ FILM SCREENING: DOCUMENTARY I

10:00 - 11:10 / BELLARIA CINEMA

▶ FILM SCREENING: DOCUMENTARY II

11:30 - 12:30 / BELLARIA CINEMA

▶ FILM SCREENING: DOCUMENTARY III

11:00 - 13:00 / NHM Café

● WORKSHOP: HELLO TOMORROW P.54

With Nadine BONGAERTS: Incubating Start Up Ideas

13:00 to 14:00 / NHM – Room VI

● ARTIST'S WORK IN PROGRESS:  
PRESENTATION OF PROTOTYPE

with Herwig Weiser

13:00 - 14:30 / NHM

LUNCH ☕

14:30 - 15:45 / NHM

● HOMO LUDENS:  
PLAYING WITH LIFE, SERIOUSLY P.56

Moderator: Olga RADCHUK

- Asi BURAK: Games for Change: With Great Power Comes Great Responsibility
- Mario HERGER: Gamification in Science

x Discussion with Asi BURAK, Mario HERGER, Uwe SLEYTR and Virgil RERIMASSIE

15:45 - 16:15 / NHM

COFFEE BREAK & INTERACTION ☕

16:15 - 18:00 / NHM

● HOMO RECIPROCANS:  
BIO-COMMONS AND INTELLECTUAL PROPERTY P.60

Moderator: Erich BERGER

- Philipp PFINGSTAG: The Changing Nature of Intellectual Property Rights in Synthetic Biology
- Thomas MARGONI: Intellectual Property, Licenses and Science
- Laurens LANDEWEERD: Who Owns Nature? Issues Of Social Exclusion in the Instrumentalisation of Life
- Rüdiger TROJOK: The Bio-Commons Whitepaper

x Presentations: Hello Tomorrow with Nadine BONGAERTS

19:30 - 20:00 / NHM (Dome Hall)

ADMISSION TO GALA EVENT ☕

Buffet dinner and drinks

20:00 - 22:00 / NHM (Dome Hall)

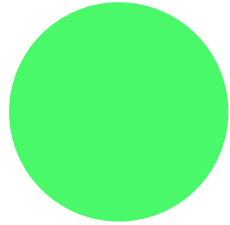
★ GALA BIO-FICTION FILM AWARDS ★

Registration required, please email [registration@bio-fiction.com](mailto:registration@bio-fiction.com). 250 people max.

Moderator: Thomas EDLINGER (FM4)

- Address of Welcome by NHM Director Christian Köberl
- Address of Welcome by BIO-FICTION Organizers Markus SCHMIDT and Camillo MEINHART
- Interview with Jury Members
  - x Award for Best Animation Short Film
  - x Award for Best Fiction Short Film
  - x Award for Best Documentary Short Film
  - x Award for Special Prize of the Jury

Closing



11:00 - 13:00 / NHM Café

## WORKSHOP: HELLO TOMORROW

With Nadine BONGAERTS: Incubating Start Up Ideas

Hello Tomorrow: a European technology & entrepreneurship competition

Hello Tomorrow started as a grand European competition and conference for technology & entrepreneurship in April 2014; it is now expanding on a worldwide basis.

Hello Tomorrow's mission as a global initiative is to accelerate innovation by removing the barriers between research, design and business fields.

In support of this mission, Hello Tomorrow set up a competition, conference and community where engineers, students, investors, scientists, designers, policy makers are stimulated to exchange knowledge and collaborate on finding revolutionary applications to new technologies.



## Workshop: Hello Tomorrow

The goal of the workshop is to put forward the potential of interdisciplinary projects, such as Hello Tomorrow, in their ability to bridge the gap between knowledge & markets.

Crafted as a collaborative moment, it will allow artists / designers / scientists to explore the market potential of biodesign projects by adopting a business thinking.

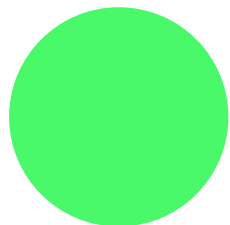
In the end, small teams present a biodesign startup idea in front of a Biofiction audience and the winning team will receive free tickets for the Hello Tomorrow Conference 2015 + 1 year membership.

## Nadine BONGAERTS

Hello Tomorrow/Kairos Foundation, Netherlands

Nadine Bongaerts is the Global Community Director of Hello Tomorrow, Dutch Chair of the Kairos Society and co-owner of Biotecture. She has an academic background in biotechnology (Delft University of Technology) and is a strong connector between science, business and society.

In 2011, she co-founded Biotecture to enhance the public awareness and understanding of life science developments. As the Dutch chair of the Kairos Society, she supports young entrepreneurs to accelerate the path to market of their businesses and to build international relationships. Her recent position in the Hello Tomorrow organization allows her to remove the barriers between the academic and business fields, stimulate innovative entrepreneurship and build interdisciplinary bridges worldwide.



14:30 - 15:45 / NHM

HOMO LUDENS:

PLAYING WITH LIFE, SERIOUSLY

Moderator: Olga RADCHUK

- Asi BURAK:

Games for Change: With Great Power Comes Great Responsibility

- Mario HERGER:

Gamification in Science

x Discussion

with Asi BURAK, Mario HERGER, Uwe SLEYTR and Virgil RERIMASSIE

SAT 25/10/14  
14:30 - 15:45 / NHM  
HOMO LUDENS:  
PLAYING WITH LIFE, SERIOUSLY



## Games for Change: With Great Power Comes Great Responsibility

The talk will address the power of digital games as a maturing medium and a largely untapped tool “for good”.

It will make an impassioned case for using games for social impact and learning, with an overview of the latest trends and core challenges.

Burak will share some case studies and success stories including his unique entry to the field, leading the team behind the award-winning game “PeaceMaker” around the Israeli-Palestinian Conflict.

Attendees will learn about the field at large and how Games for Change is leading the future of this movement with a coalition of public and private partners.

**Asi BURAK**

Games for Change, USA

Asi Burak is an award-winning game creator, tech executive, and social entrepreneur. He is the President of Games for Change (G4C), a nonprofit with the mission to catalyze social impact through digital game. As the Executive Producer of the Half the Sky Movement games, he orchestrated partnerships with Zynga, some of the world's leading NGOs and Pulitzer Prize-winning authors Nicholas Kristof and Sheryl WuDunn. The Facebook game has reached 1.3 million registered players and generated \$500,000 in donations.

Prior to that, Burak co-founded Impact Games and created the internationally acclaimed “PeaceMaker” and “Play the News” gaming platforms. He also served as a consultant to companies such as EON Productions (007), Newsweek and McCann Erickson, around the strategic use of games to further brand engagement. A native of Israel, Burak was Vice President of Marketing and Product at Axis Mobile (acquired 2008), where he introduced pioneering mobile apps and games to a worldwide market (Asia, Europe, U.S.). He is a faculty member at the School of Visual Arts' MFA in Design for Social Innovation and holds a Master of Entertainment Technology from Carnegie Mellon University.



SAT 25/10/14

14:30 - 15:45 / NHM

HOMO LUDENS:

PLAYING WITH LIFE, SERIOUSLY



## Gamification in Science

Gamification - the use of game design elements in a non game context - has become an important tool to solve science problems faster and better. In this talk we will hear what gamification is, how it works, how effective it is, how it has been used in science, and how you can apply it.

**Mario HERGER**

Enterprise Gamification, USA

Mario HERGER is CEO, founder and partner of Enterprise Gamification Consultancy LLC, a strategic consulting group focused on gamification, innovation, social business, and intrapreneurship in the enterprise. He had been Senior Innovation Strategist at SAP Labs in Palo Alto, California and Global Head of the Gamification Initiative at SAP.

He is the author of the following gamification books:

- Enterprise Gamification - Engaging people by letting them have fun 2014
- Gamification in Human Resources, 2014
- Gamification in Banking & Financials, 2014
- Gamification in Community & Innovation Management, 2014
- Gamification @ Work: Designing Engaging Business Software (co-author Janaki Kumar), 2013

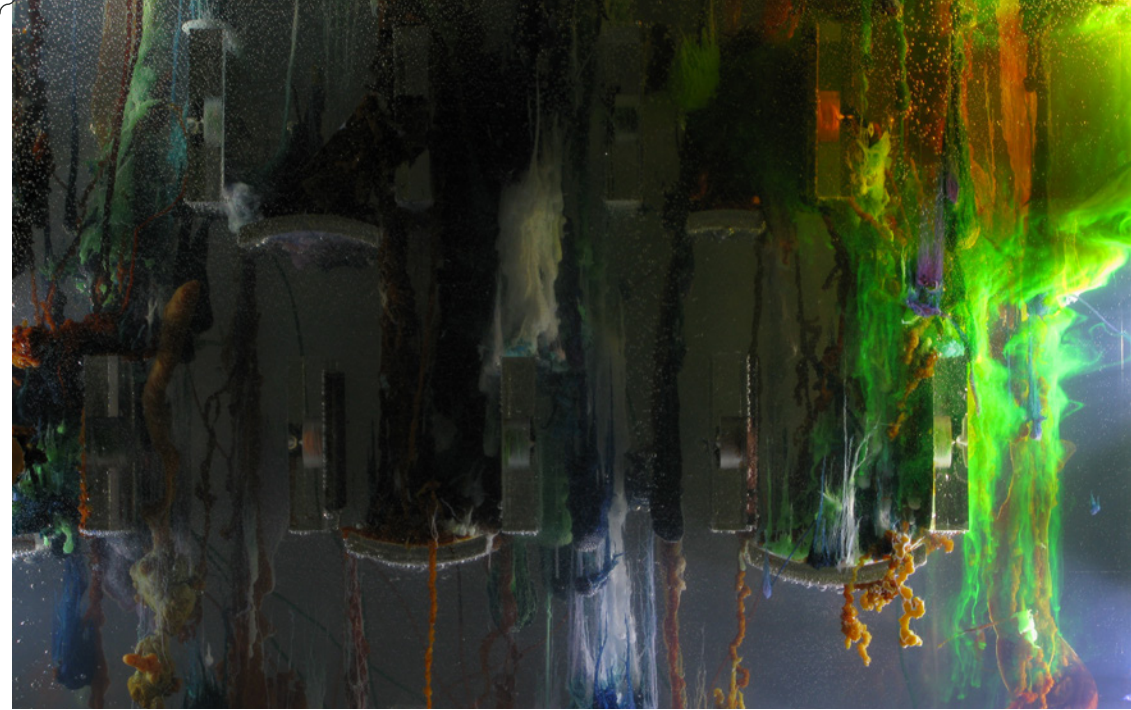
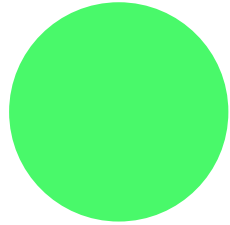


Image by Herwig Weiser - Lucid Phantom Messenger (page 21)



16:15 - 18:00 / NHM

## HOMO RECIPROCANS: BIO-COMMONS AND INTELLECTUAL PROPERTY

Moderator: Erich BERGER

- Philipp PFINGSTAG:

The Changing Nature of Intellectual Property Rights in Synthetic Biology

- Thomas MARGONI:

Intellectual Property, Licenses and Science

- Laurens LANDEWEERD:

Who Owns Nature? Issues Of Social Exclusion in the Instrumentalisation of Life

- Rüdiger TROJOK:

The Bio-Commons Whitepaper

x Presentations:

Hello Tomorrow with Nadine BONGAERTS

SAT 25/10/14

16:15 - 18:00 / NHM

## HOMO RECIPROCANS: BIO-COMMONS AND INTELLECTUAL PROPERTY



## The Changing Nature of Intellectual Property Rights in Synthetic Biology

Synthetic biology has its roots in biotechnology and has to deal with a vast number of existing intellectual property rights. With its highly complex products the intellectual property rights situation of synthetic biology is comparable to the situation in the IT industry. One product can involve hundreds of patents which makes cross-licensing patents inevitable and will cause inadvertent infringement of patents. Biotechnology firms have to learn how to adapt to the new circumstances. Firms have to strike new paths to remain innovative and repel emerging threats like patent trolls.

### Philipp PFINGSTAG

TU Munich – School of Management – Technology and Innovation Management, Germany

Philipp Pfingstag graduated from the University of Zurich in 2013 majoring in Chemistry and Business Studies. During his studies he conducted his own "biohacker" project. In the same year he started his PhD supervised by Prof. Henkel at the chair for Technology and Innovation Management at Technische Universität München. As part of a European research consortium on Synthetic Biology he works on economic dimensions and ramifications of biological standards.



## Intellectual Property, Licenses and Science

This talk offers a general introduction to IP and to its main features. The objective is to clarify which rights are triggered by the different activities involved in the development of new tools, procedures and products in highly advanced scientific and technological research. Much of the current debate in the field, in fact, still suffers from a reciprocal misunderstanding between scientist and lawyers on the implications of concepts such as patents, copyright and licenses. By setting a common ground of shared terminology the talk intends to enable the discussion on the type of legal strategies scientists interested in sharing the output of their research should consider.

### Thomas MARGONI

Faculty of Law -  
University of Amsterdam,  
Netherlands

Dr. Thomas Margoni is a senior researcher at the Institute for Information Law (IViR), Faculty of Law, University of Amsterdam. He has been researching, teaching and advising in the field of information law, intellectual property, telecommunication and media law over the past 10 years. He has published extensively in the field, and received wide recognition for his work.



## Who Owns Nature? Issues Of Social Exclusion in the Instrumentalisation of Life

Our biotope by nature is a technotope: as the beaver builds dams to create artificial lakes, we can also be considered 'niche constructors'; rather than relocating to environments that fits our needs, we construct our own or adjust ourselves. Still, in our intellectual traditions as well as in social values and worldviews, a sharp distinction is drawn between the grown and the made, natural states and artificial, technological, interventions therein. In the current academic, social and industrial arena, synthetic biology is changing this. It is a 'game changer', not only in this conceptual sense, but also in its economic relevance: only products that are made can be patented, and nature cannot. Patenting guarantees profit from intellectual effort, but also steers innovation towards unjust international distribution. The blurring of the distinction between the grown and the made, may therefore contribute to a new fundament for a culture of sharing.

### Laurens LANDEWEERD

TU Delft/Bioart Laboratories, Netherlands

Laurens Landeweerd is a philosopher working at Delft University and Radboud University Nijmegen. Landeweerd was involved in several projects on ethics and governance of industrial biotechnology. He was acting coordinator for SynthEthics, a project for the European Commission's 7th Framework Programme and researcher for some seven further European projects on ethics and governance of science and technology, focusing on human enhancement, bioethics, industrial biotechnology and the biobased society. His main research interest can be circumscribed as 'applied metaphysics': an investigation of social issues of science and technology on the basis of concept analysis and (normative) philosophical theory.

SAT 25/10/14

16:15 - 18:00 / NHM

HOMO RECIPROCANS:

BIO-COMMONS AND INTELLECTUAL PROPERTY



## The Bio-Commons Whitepaper

Common goods are not owned by individuals and allow for the use by everyone. With the increasing insights of the life sciences into the fundamental setup of nature, the idea of natural goods can be applied on organisms, cells, genes, pathways and any conceivable resources found in any organisms. The concept can be further enlarged with the advent of genetic engineering and its successor: synthetic biology. Now, discoveries, inventions and man-made creations such as genetic codes, algorithms, novel metabolic pathways and molecular processes designed for and realized in biological media and even entire organisms can be considered as natural goods. Alternative IP regimes such as open-access and open-source could in future help to leverage the costs for research and development in the life sciences, to mobilize unused knowledge, spark new inventions and be more adaptable to actual innovation speed.

**Rüdiger TROJOK**

Karlsruhe Institute of Technology - ITAS, Germany

Rüdiger Trojok studied systems and synthetic biology at the University of Potsdam and the University of Freiburg in Germany and Denmark Technical University in Copenhagen and worked as a freelance consultant for the technology assessment office at the German Bundestag and is now a scholar at the Institute for Technology Assessment and Systems Analysis, Karlsruhe University (ITAS, KIT). There, he explores new ways to make the fruits of science available to a larger audience and to enable a molecular understanding of the relations of nature and civilization. Currently he is building up a citizen science biolab in Berlin and is actively promoting open source biotechnology in science, public, politics and the arts.

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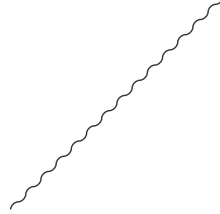
# FILM FESTIVAL GALA & AWARD CEREMONY

19:30 – 22.00

Natural History Museum  
Upper Cupola hall  
1st floor

(with dinner buffet 19:30-20:00)

NOTES:



NOTES:



## NOTES:

### BIO-FICTION FESTIVAL TEAM:

Dr. Markus Schmidt (Producer)

Camillo Meinhart (Co-producer)

Jens Hauser (Curatorial advisor)

Sonja Schachinger (Production assistance)

Sandra Youssef MA (Hosting)

Birgit Marie Schmidt MA (Communication)

### HOSTING PARTNER:

Univ. Prof. Dr. Christian Köberl (General Director)

Dr. Reinhard Golebiowski (Exhibitions)

Ing. Walter Hamp (Audiovisual support)

Ingrid Viehberger (PR & Marketing)

Eduard Winter (Narrenturm)

Producer:

**Biofaction**

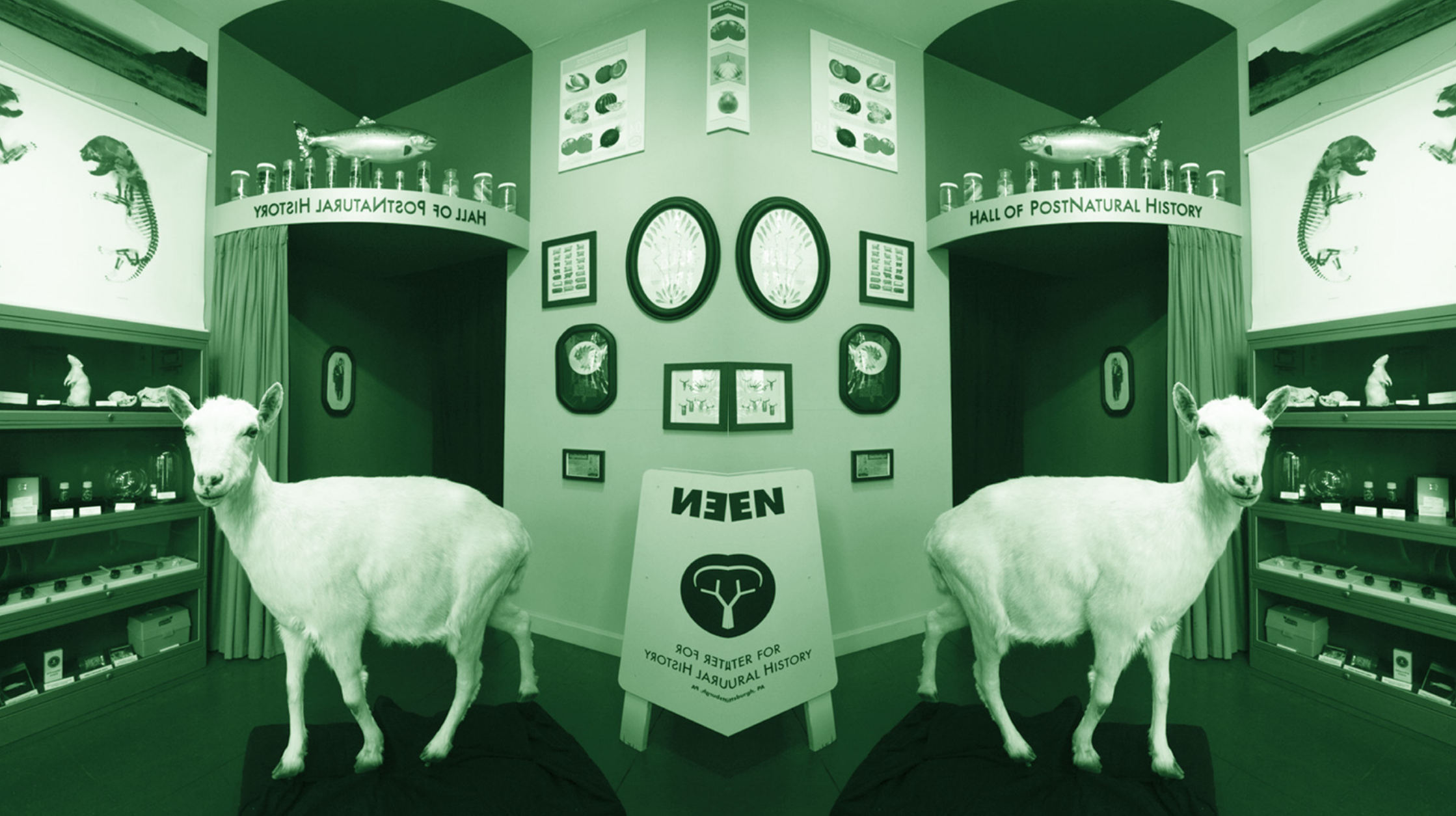
Sponsor:



Partners:







That was Then... This is Now: Recent Developments in PostNatural History (Richard PELL)





[www.bio-fiction.com](http://www.bio-fiction.com)