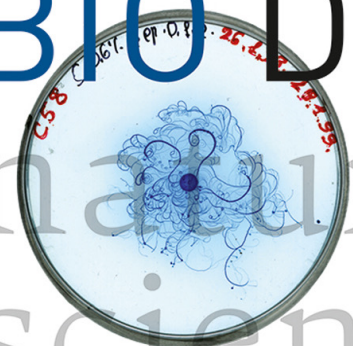
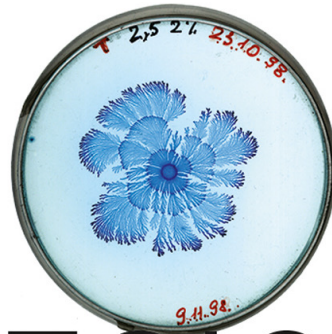




Art ~ Science Collaborations: Examples, Potential, Resources, Communication Tips

Open University: Utrecht, 15 March, 2024

William Myers



BIO DESIGN

nature
science
creativity

WILLIAM MYERS

REVISED AND EXPANDED EDITION

Thames & Hudson

Foreword by Paola Antonelli



About the book: BioDesign: Nature + Science + Creativity by William Myers is published by The Museum of Modern Art (MoMA) in New York and Thames & Hudson in London. BioDesign presents recent design and art projects that integrate with living systems.

Hardcover: 288 pages

Illustrations: 467

Dimensions: 10.2 x 8.3 x 1.2 inches

Language: English

ISBN-10: 0500516278

ISBN-13: 978-0500516270

Altered Realities

William Myers

BioArt



Thames & Hudson

William Myers

BioArt

Altered Realities



Thames & Hudson

Publication Details: 256 Pages, 250 color illustrations, Hardcover

Publisher: Thames & Hudson, London

Author: William Myers

Foreword by Suzanne Anker, Founding Director of the Bio Art Lab at the School of Visual Arts, New York

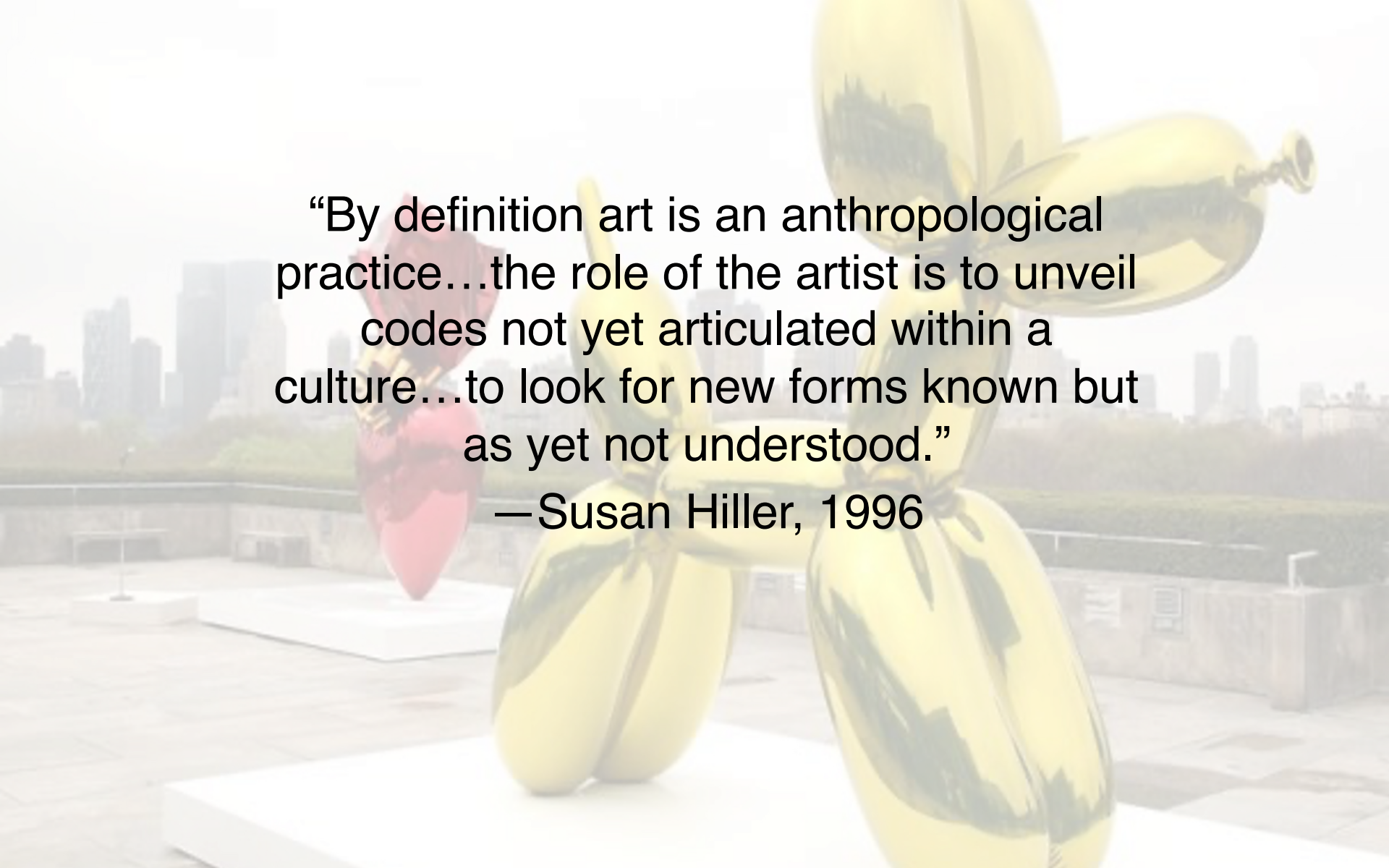
Text contributors: Wythe Marshall, Julia Buntaine, Mariam Aldhahi

Featured artists include: Mark Dion, Eduardo Kac, Vincent Fournier, Patricia Piccinini, Julia Lohmann, Anna Dumitriu, Uli Westphal

Why is bioart important?

Shifts in:

1. Definitions of life and nature
2. Notions of identity as related to genetic determinism, epigenetics
3. Our interconnections with the environment and one another

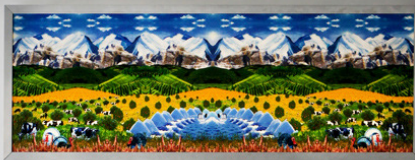


“By definition art is an anthropological practice...the role of the artist is to unveil codes not yet articulated within a culture...to look for new forms known but as yet not understood.”

—Susan Hiller, 1996









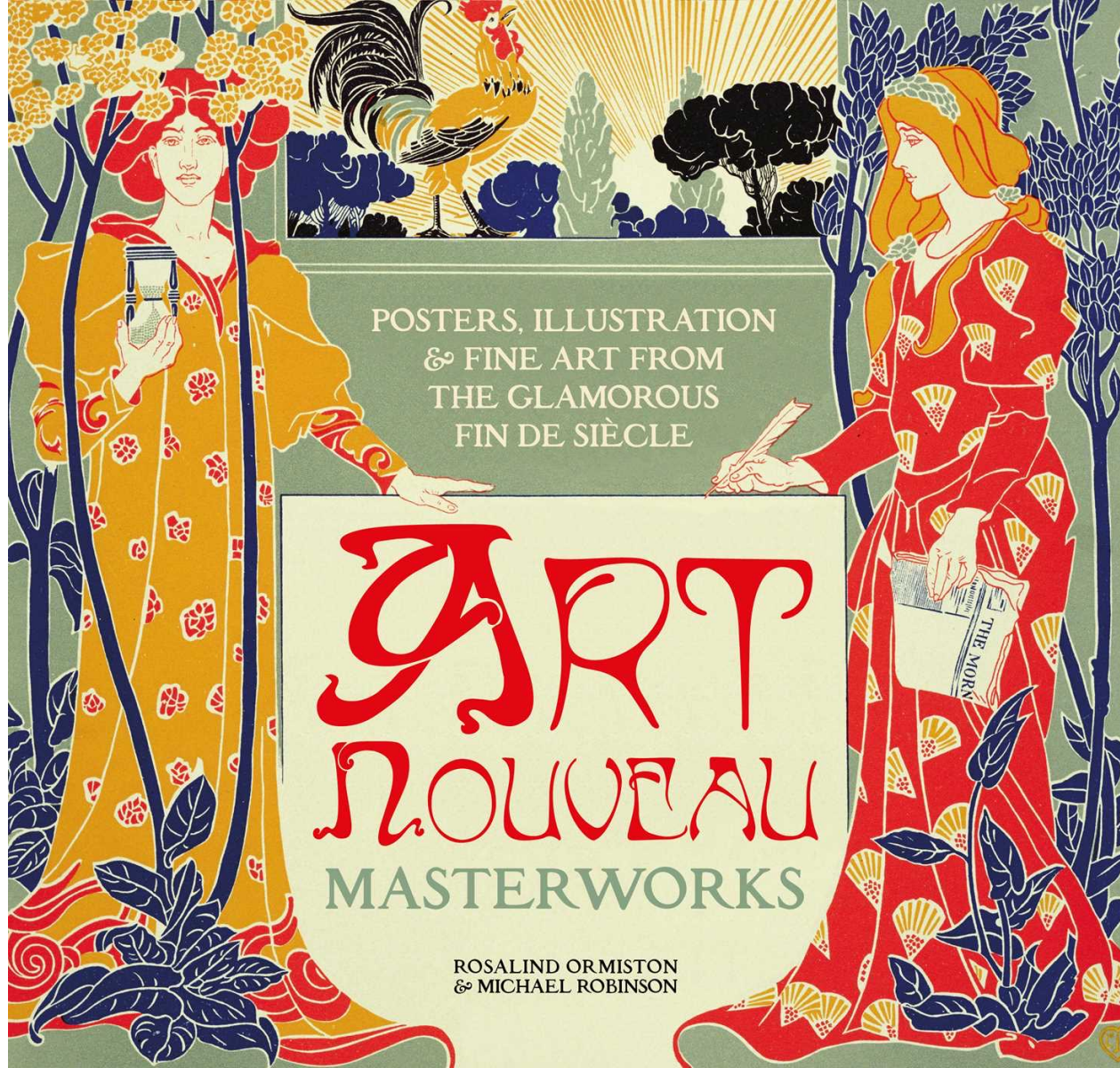












POSTERS, ILLUSTRATION
& FINE ART FROM
THE GLAMOROUS
FIN DE SIÈCLE

ART
NOUVEAU
MASTERWORKS

ROSALIND ORMISTON
& MICHAEL ROBINSON



The
Economist

AUGUST 18TH-24TH 2012

Economist.com

The Catholic church's unholy mess

Paul Ryan: the man with the plan

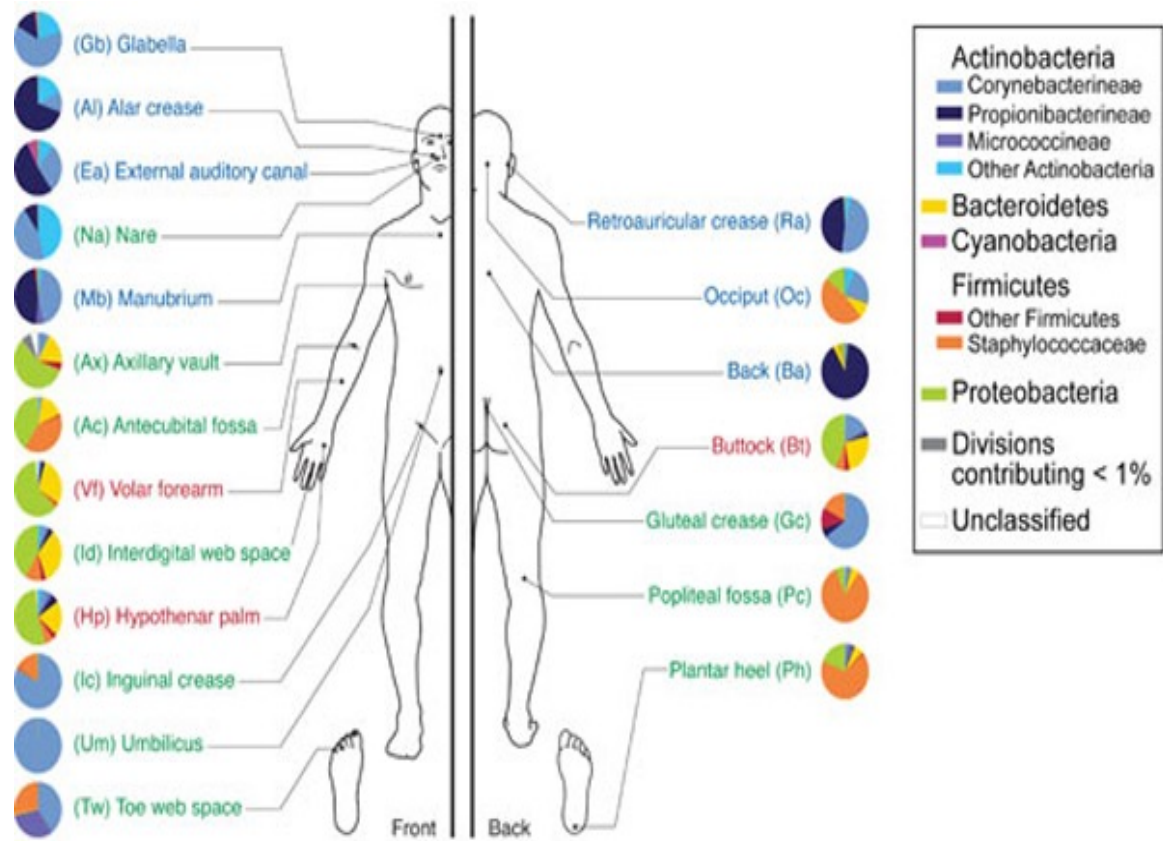
Generation Xhausted

China, victim of the Olympics?

On the origin of specie

Microbes maketh man





THE NEW YORK TIMES BESTSELLER

I
**CONTAIN
MULTITUDES**

THE MICROBES WITHIN US
AND A GRANDER
VIEW OF LIFE

ED YONG

'Marvellous, thrilling...a page-turner... All life is here, and death too, and sex and violence, including deviations of which you had never dreamed'

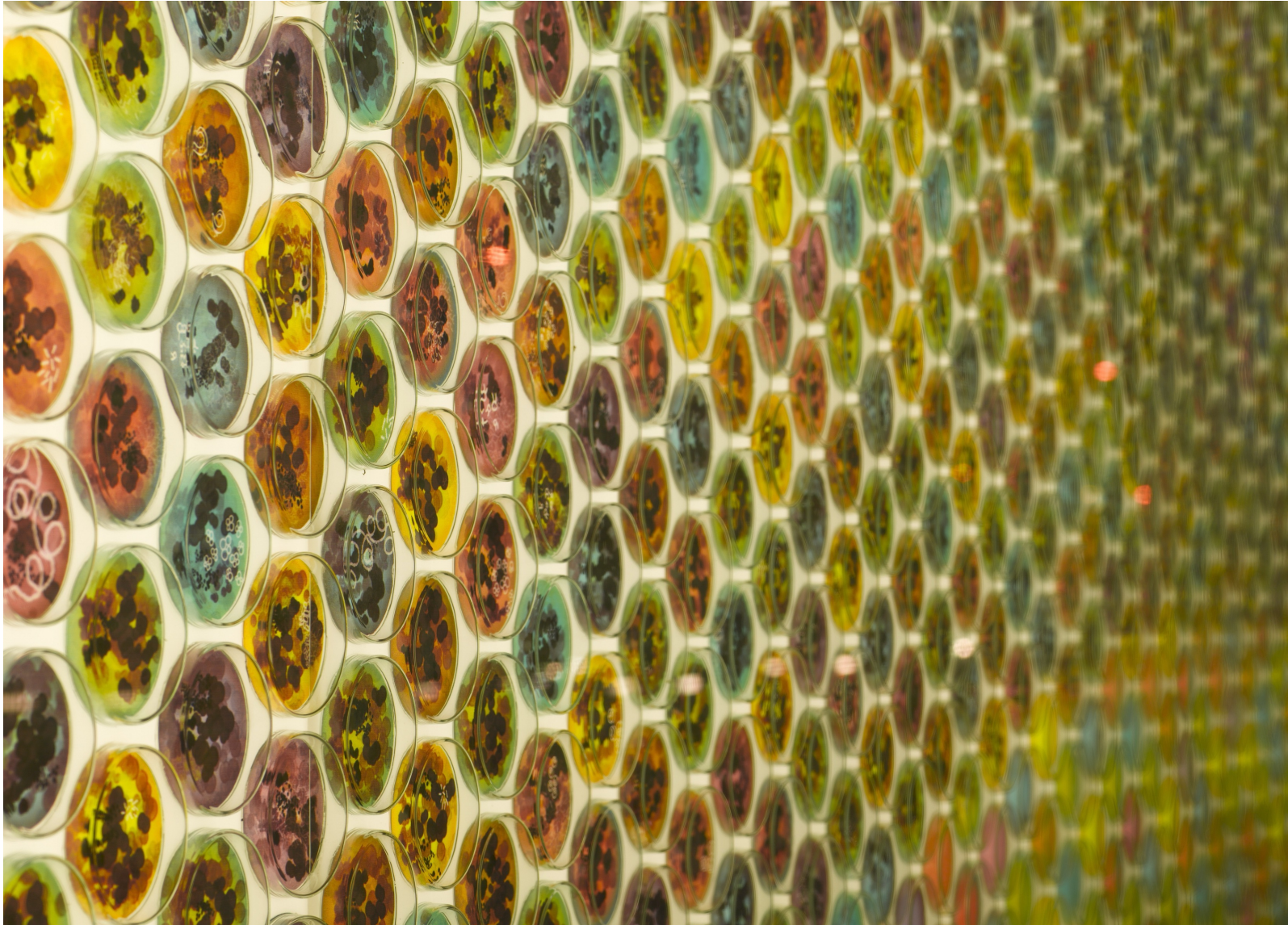
GUARDIAN

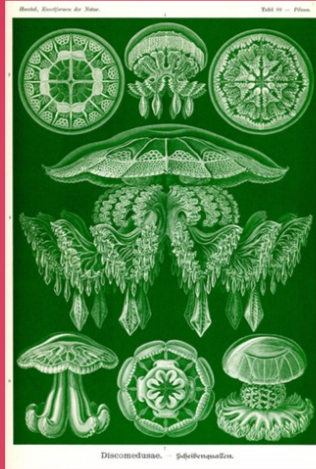


BIOLOGY AND THE BUILT ENVIRONMENT





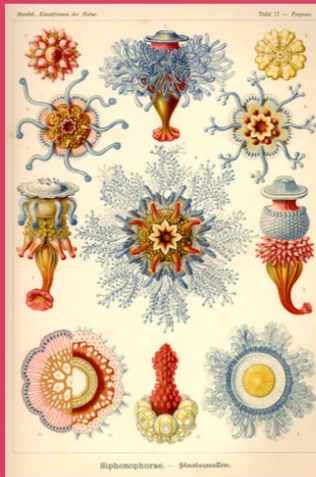




3



4



5



6

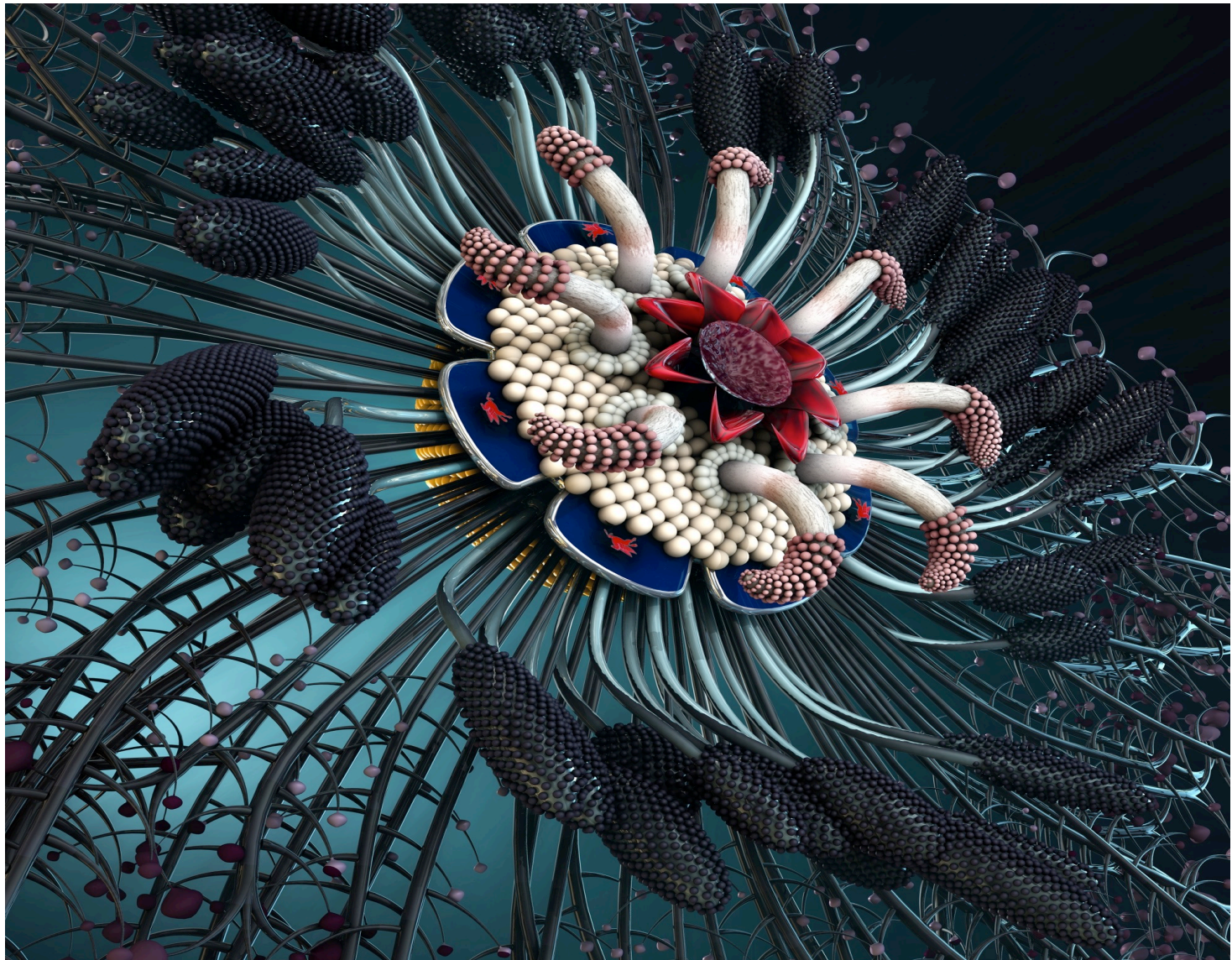
Clockwise from top left:

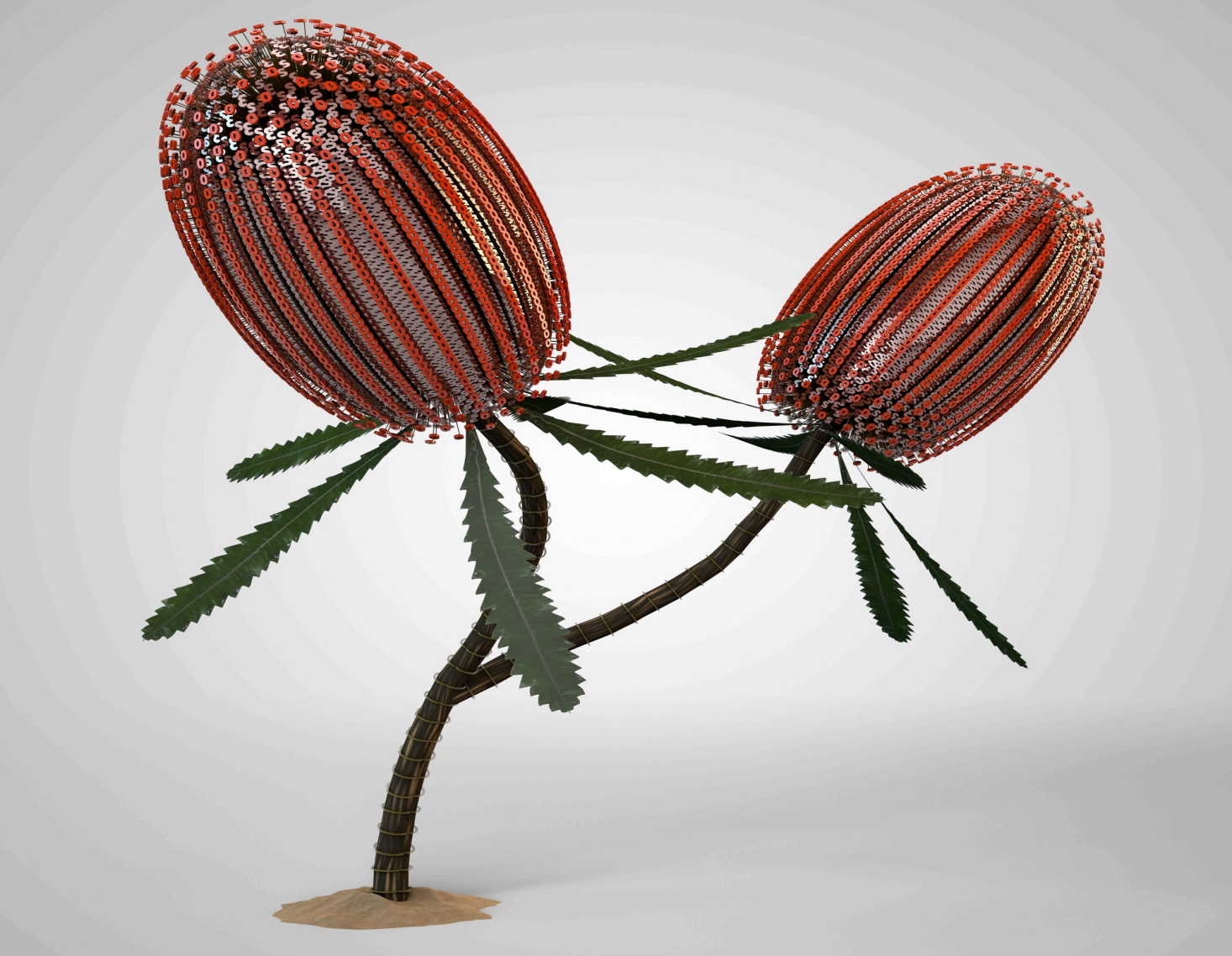
Plate 88 from *Kunstformen der Natur* (Art Forms in Nature),
Ernst Haeckel, 1904

Study for an Electric Light,
Hendrik Berlage, 1914

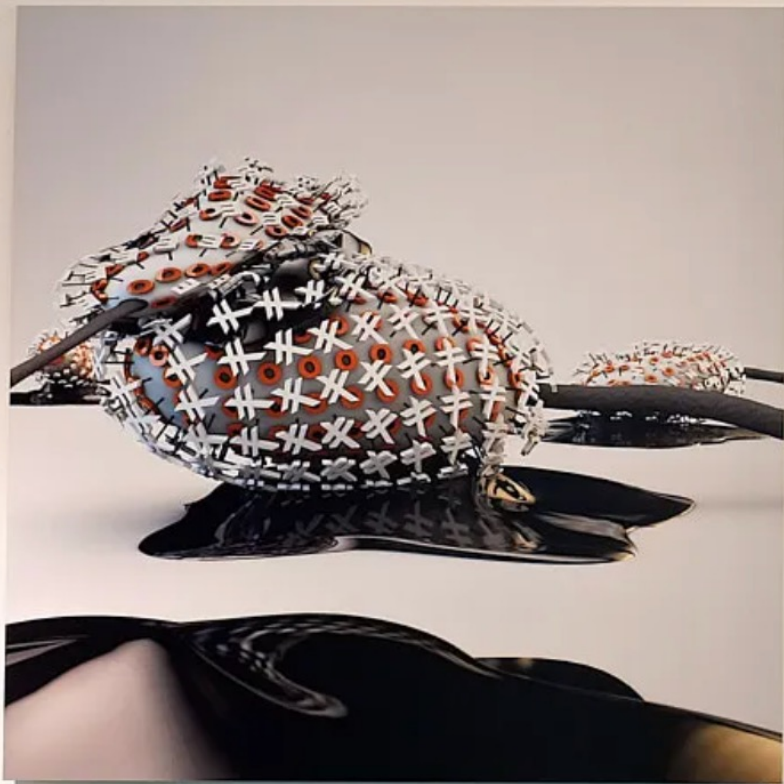
Fifty Sisters, Jon McCormack,
2012

Plate 17 from *Kunstformen der Natur* (Art Forms in Nature),
Ernst Haeckel, 1904















Sci-fi Crime Drama with a Strong Black Lead

The practice of rendering appearance from forensic samples is called “Forensic DNA Phenotyping” (FDP) or “molecular photofitting,” and there are a handful of scientists and companies around the world trying to make this not only scientifically possible, but also a useful law enforcement tool. FDP has already been used to create a new kind of police sketch.

[Read full article at The New Inquiry](#)





Babies with two biological same-sex parents could become a reality in just two years

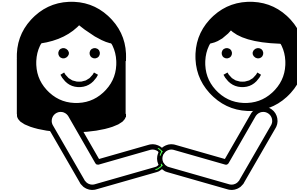
 Molly Rose Pike

 23rd February 2015, 2:48 PM



I(')mpossible baby

In 2013, same sex marriage was a hot topic around the world, as more than 25 countries and local governments followed the Netherlands in legalizing it. The theme of my next project will be babies in same-sex marriages.

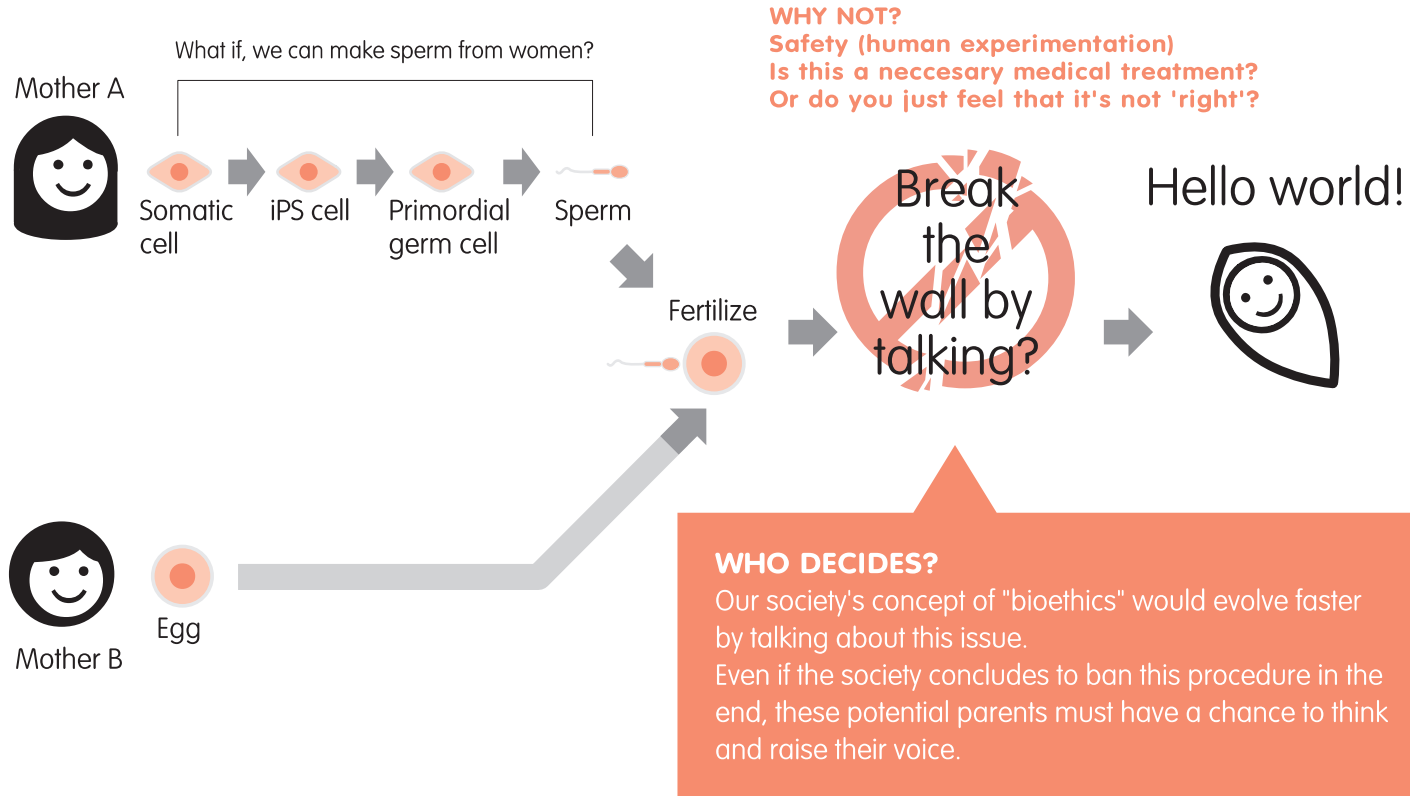


Same sex marriage

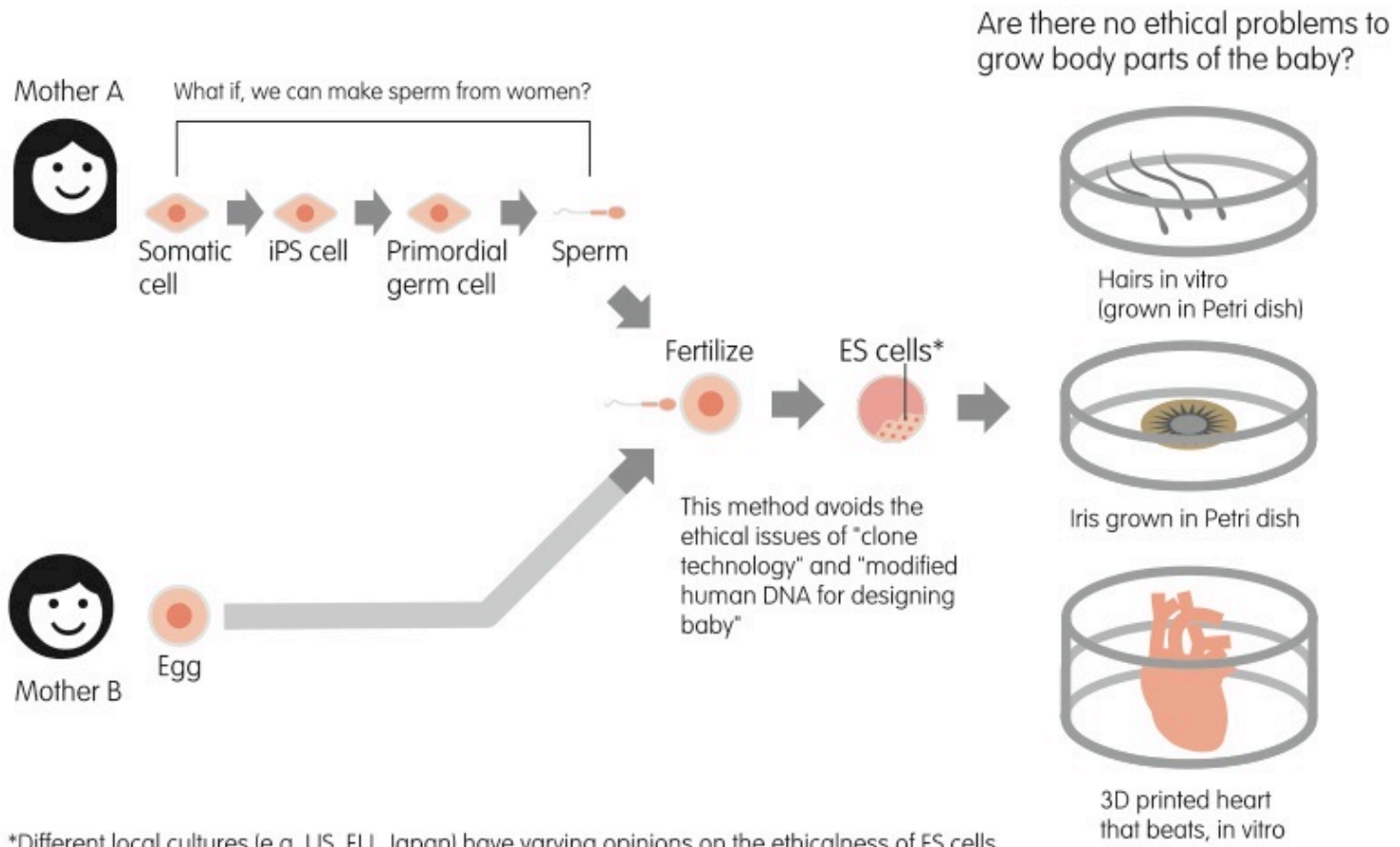


Baby

NOW: [Impossible Baby] Baby from same sex parents



STEP3(future):[Organ baby] Make the baby's body parts



*Different local cultures (e.g. US, EU, Japan) have varying opinions on the ethicalness of ES cells

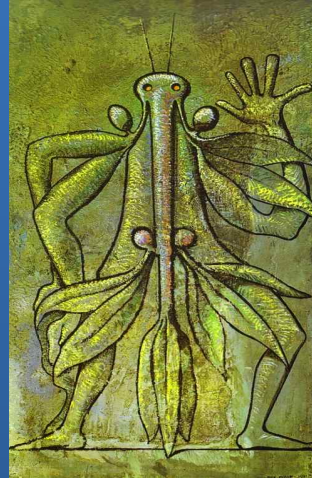
Clockwise from top left:

Film still from *Cremaster 3*,
Matthew Barney, 2002

TV Cello, Nam June Paik and
Charlotte Moorman, 1971

Max Ernst, *Human Form*, 1931

Vincent Fournier, *Post-Natural
History*, 2012–ongoing





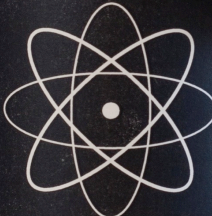


60

SHAGED
10/14

BEFORE
10/14

SHARATE
SPRINGING



COBALT 60 SAUCE

Net 10 fl. oz | 0.3 QT | 296 ml

TIMELINE
COBALT 60 SAUCE





DE-EXTINCTION

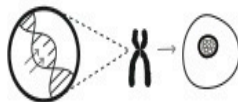


METHOD ONE

Reverse Engineering



1 Extract DNA from the remains of an extinct species and sequence its genome.



2 Supplement any missing genetic information with that of the closest living relative. Add genes to chromosomes which will carry genetic material in the germ cell nucleus.



3 Inject the nucleus into the early embryos of the closest relative to the extinct species.



4 The generation that hatches from these embryos will carry the genes from the extinct animal.



5 The next generation produced by these carriers will have the genes and traits of the now de-extinct species.

6 The de-extinct species must be provided with a habitat that suits its needs.

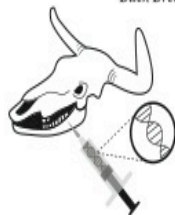


DE-EXTINCTION



METHOD TWO

Back Breeding



1 Gather genetic material from preserved bone and tooth samples to re-create DNA.



2 Compare re-created DNA to that of modern close relatives to determine which breeds still carry the species' genetic characteristics and make up.



3 Reverse the evolutionary process by selectively breeding specific close relatives.



4 Each generation will more closely resemble the extinct species.



DE-EXTINCTION

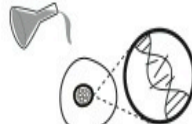


METHOD THREE

Cloning



1 Extract living cells from an endangered species OR use stored frozen cells from a species that has recently gone extinct.



2 Replace the nucleus in the egg of a close relative with the nucleus from the extinct animal.



3 Adjust DNA from the adult cell to be used in an embryo cell, using chemicals and/or electricity to reconfigure the DNA.

4 Let fertilized egg grow and place in a surrogate mother.

5 Place de-extinct species in a suitable habitat.

WHAT IS DE-EXTINCTION?

Creating an organism which is a member of, or resembles, an extinct species.

DE-EXTINCTION
DELI

Food
phreaking
issue #0
DKK 100
↓

@centegg
#deextinctiondeli
www.genomic
gastrology
.com

| | | |
|-----|-----|-----|
| II | III | III |
| III | III | III |

could
build
so we
build
@P
a P

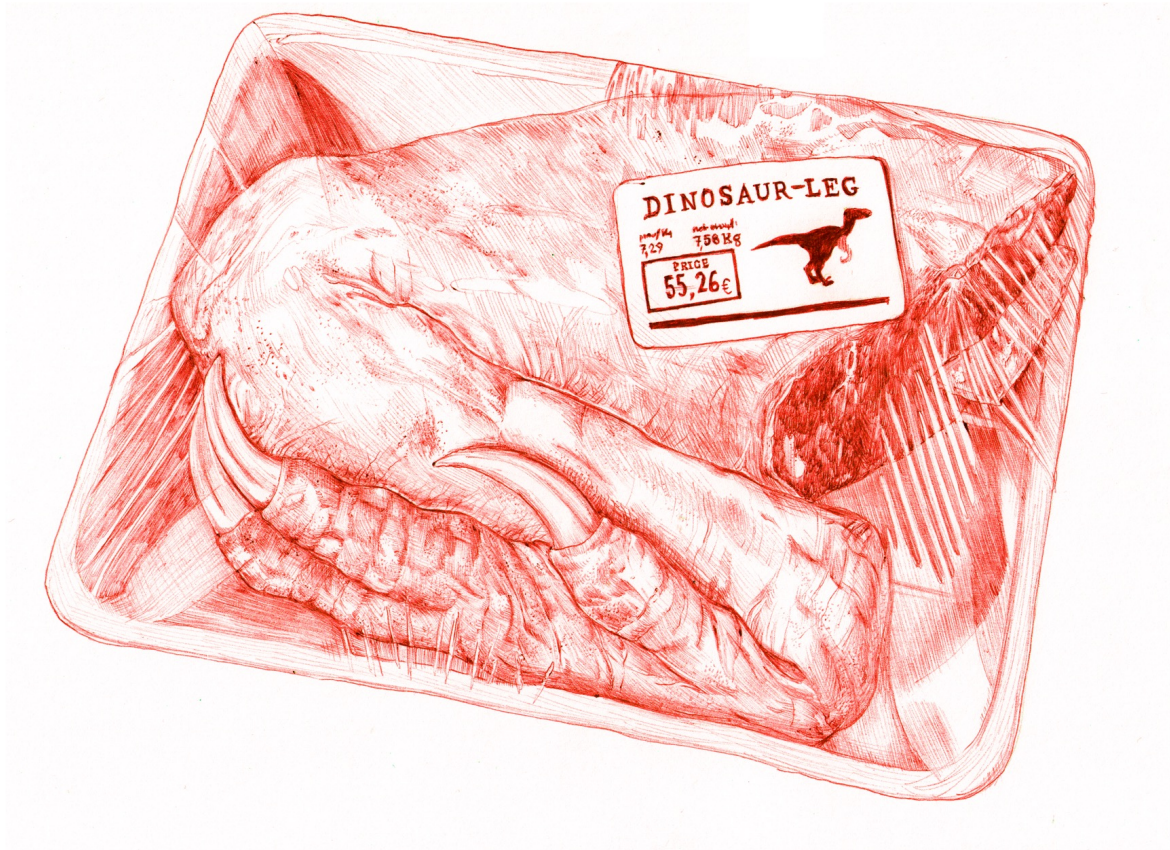
ers n
ut e
of
roost
P

Latin
extinc
row

crisis
als
W
OTE
RE



↪ YESTERDAY'S
MEAT
TOMORROW





Social Justice Side Note: WTF?



“Sometimes I feel Paik doesn’t really think of me as Charlotte Moorman.
He looks on me as a work of his.” –Moorman, 1975



Downloads

[Download the e-book here](#)

Emerging Bioart and Biodesign



Bio Art & Design
Award

Table of contents

| | | | | |
|--|---|---|---|--|
| <small>WILLIAM MYERS</small> Introduction 3 | <small>NAOMI LAGERWEIJ</small> Impact study 8 | <small>BAD BOOK</small> Winning projects 10 | | |
| <small>CHAPTER 1</small> Material 17 | <small>CHAPTER 2</small> Food 50 | <small>CHAPTER 3</small> Bodies 74 | <small>CHAPTER 4</small> Motion 109 | <small>CHAPTER 5</small> Society 134 |
| <small>XANDRA VAN DER EIJK</small> “The grey zone” 176 | <small>ANGELIQUE SPANINKS</small> Interview 181 | <small>WILLIAM MYERS</small> Acknowledgements 186 | | |

Example: Charlotte Jarvis: En Posse



Example: Charlotte Jarvis: En Posse





Susana Chuva de Sousa Lopes

Professor Developmental Biology, in particular human
development

| | | |
|-----------|------------------------------------|---|
| Name | Prof.dr. S.M. Chuva de Sousa Lopes | |
| Telephone | +31 71 526 9111 | > |
| E-mail | s.m.chuva_de_sousa_lopes@lumc.nl | > |



Overview

Profile

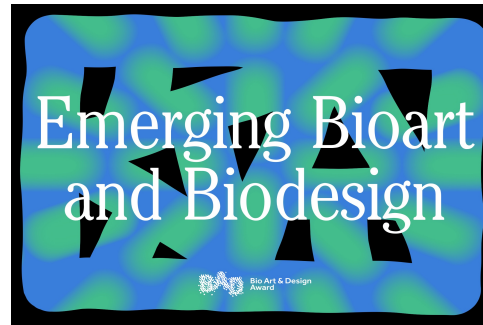
Contact

Publications

Ancillary activities

Susana Chuva de Sousa Lopes is Professor in Developmental Biology in the Department of Anatomy and Embryology at the Leiden University Medical Center. She is also Visiting Professor at the Ghent University Hospital, Belgium. She is coordinator of the “Stem Cell” group of the European Society of Human Reproduction and Embryology (ESHRE). She received a VENI (2006) and a VICI (2019) grants from NWO/ZonMW and has an ERC consolidator grant (2016). She received twice an Aspasia premium and twice the Snoo - van 't Hoogerhuijs Foundation award.

www.m21d.org/education











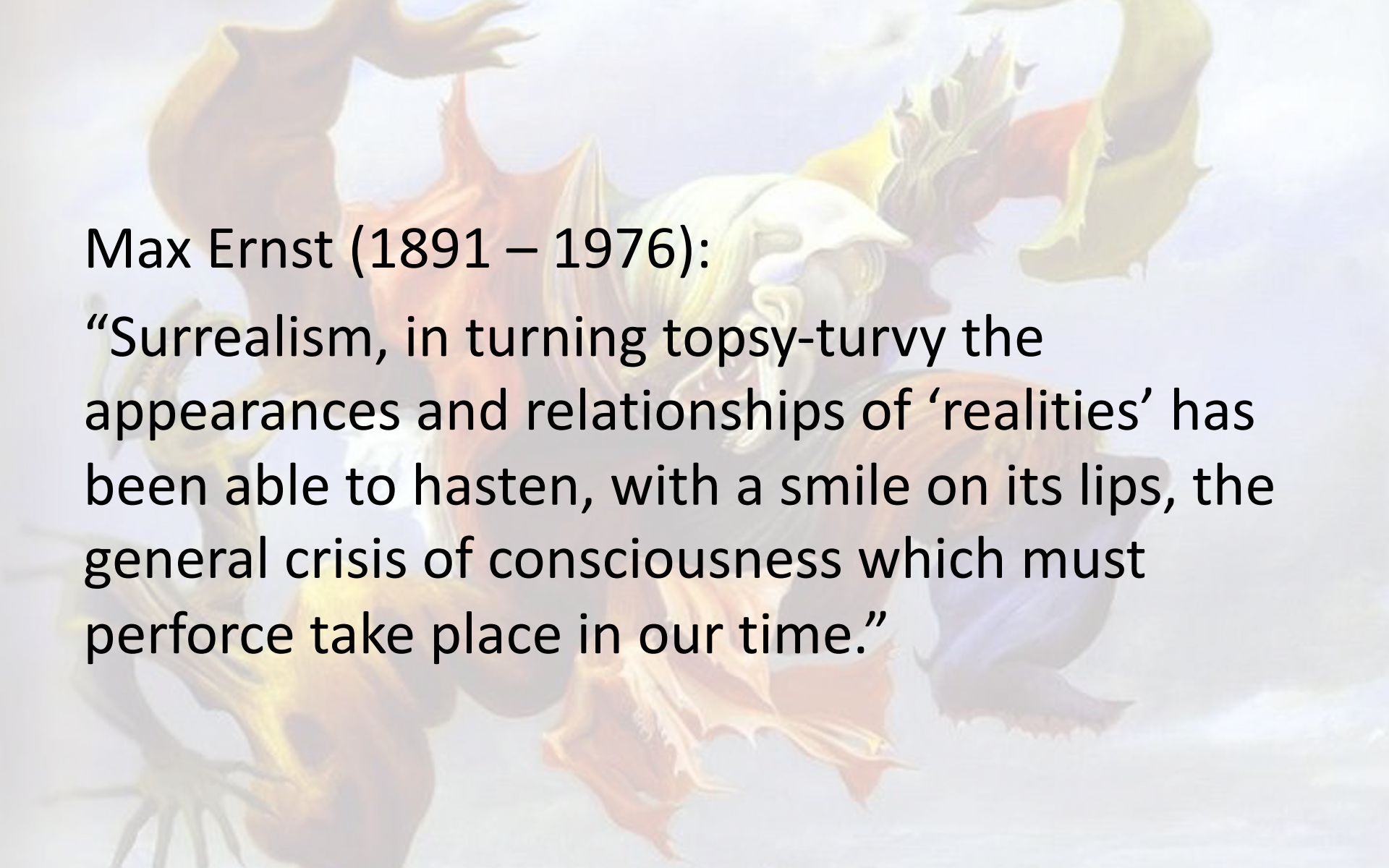
THE SHIFT

An A.I.-Generated Picture Won an Art Prize. Artists Aren't Happy.

“I won, and I didn’t break any rules,” the artwork’s creator says.







Max Ernst (1891 – 1976):

“Surrealism, in turning topsy-turvy the appearances and relationships of ‘realities’ has been able to hasten, with a smile on its lips, the general crisis of consciousness which must perforce take place in our time.”

生物设计

中央美术学院设计学科教学改革丛书
丛书主编：宋协伟 / 丛书执行主编：韩涛

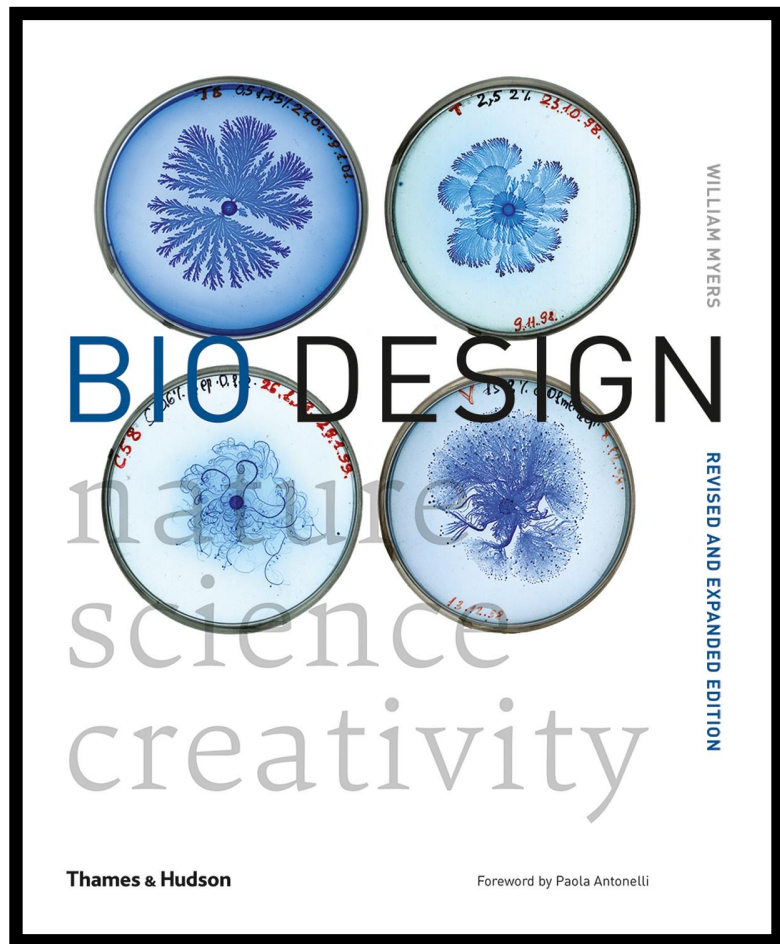


生物设计

自然
科学
创造力

[英] 威廉·迈尔斯 著 / 蔡斯阳 译 / 宋协伟 校

华中科技大学出版社
<http://www.hustp.com>



WILLIAM MYERS


BIO DESIGN

nature
science
creativity

REVISED AND EXPANDED EDITION

Thames & Hudson

Foreword by Paola Antonelli



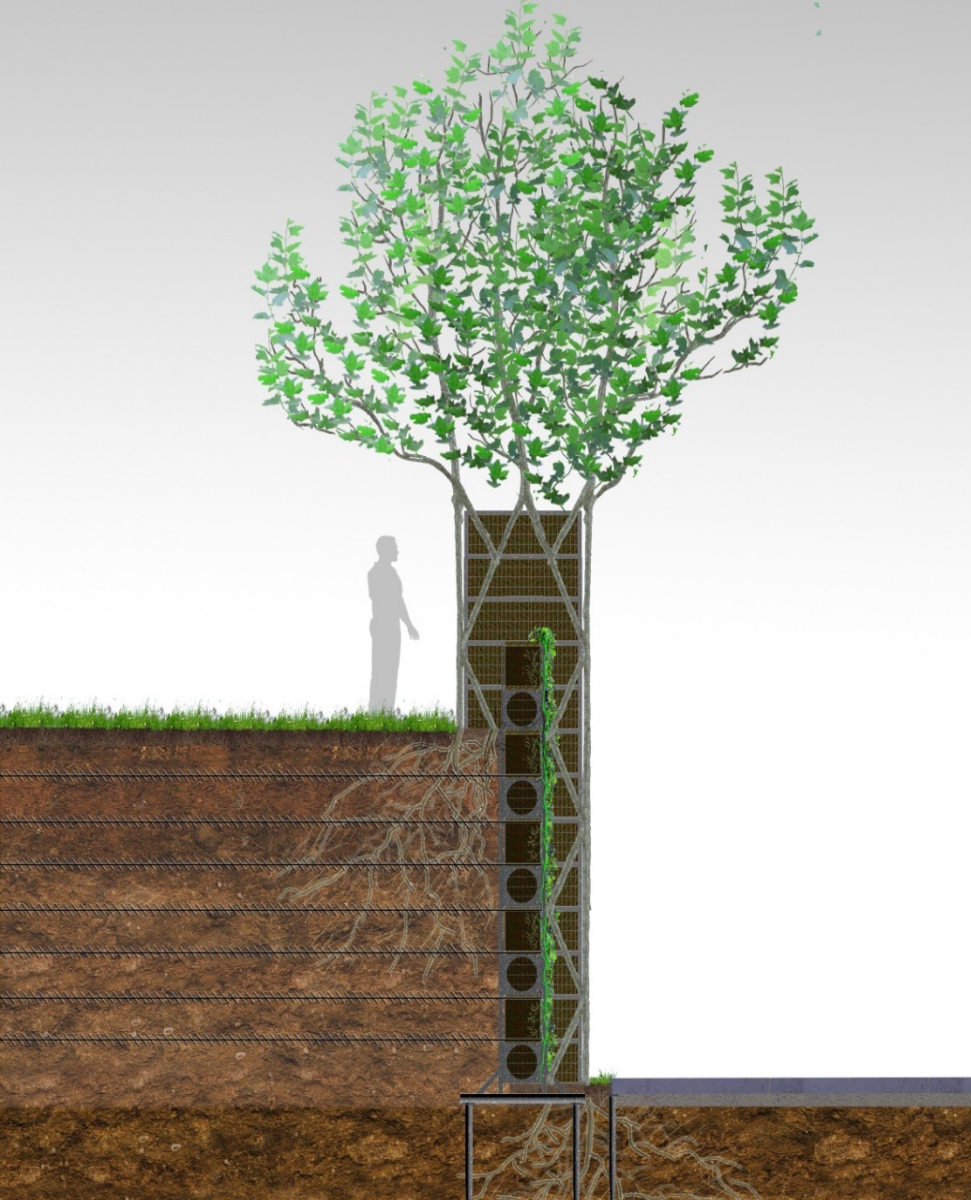
BIODESIGN = A design project that is:
WITH / FOR / ABOUT
BIOLOGY













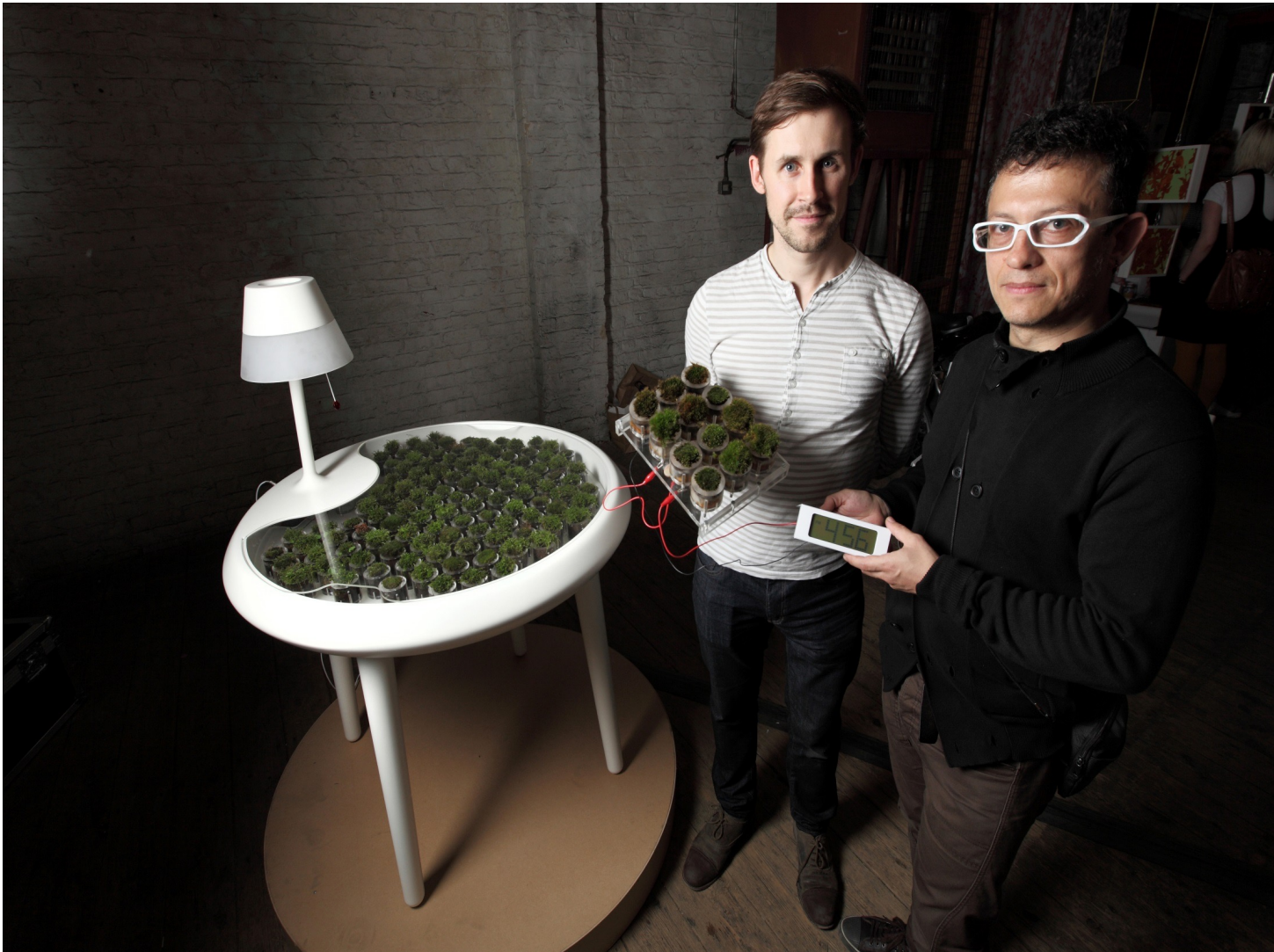
















BIODESIGN
Resources for Teachers
and Students



BIODESIGN CHALLENGE

<http://www.biodesignchallenge.org/>

<http://www.badaward.nl/>

3 Winners each receive 25.000 euros to create new work

UBC team wins Biodesign Challenge at NYC MoMA



EP 194: TESSA CALLAGHAN
AND ALEKS GOSIEWSKI

A CAUSEARTIST PODCAST

DISRUPT THE GO



PRESENTED BY:  ONETREEPLANTED

ca

A collage of natural and man-made elements. The background is a warm, golden-yellow color. In the foreground, there are several large, conical objects made of woven fibers, resembling baskets or hats. A dried, brown root system with many small branches is positioned in the center. To the right, there is a piece of yellow fabric or paper with a dark strip. In the top left corner, there are some red, dried plant parts. The overall composition is abstract and artistic.

KEEL.LABS



Het Nieuwe
Instituut

Instituut
van e-cultuur

Het Nieuwe
Instituut

boekverkopers / boekse

more... out down... infam... cooperati...



biodesign







BIO FROM INSPIRATION TO INTEGRATION DESIGN

August 25–September 27, 2018

Exhibition curated by William Myers & RISD Nature Lab

Symposium + Opening Reception August 24
Woods-Gerry Gallery
Rhode Island School of Design

Sponsors of and participants in the exhibition include

Nature Lab

RISD CO-WORKS

WYSS INSTITUTE

GINKGO BIOWORKS™
THE ORGANISM COMPANY

bdc

MoMA

GENESEE



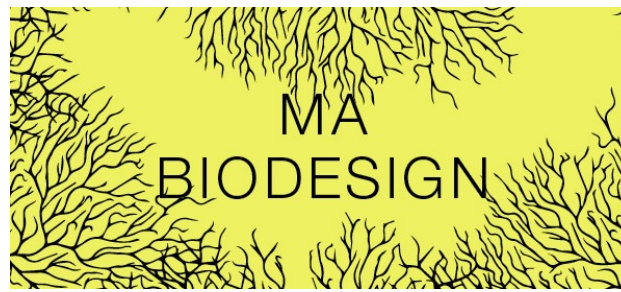
ANN



TELEPHONE







BIOFABRICATE
DESIGN, BIOLOGY, TECHNOLOGY: GROWING A BETTER FUTURE

Genspace



**Bio Art & Design
Award**

A proliferation of awards, books, conferences, and courses have materialized.

Milan Triennale: *Broken Nature*, 2019, Paola Antonelli, et al): approximately 125 objects and projects





Progression: beauty, monumentality, familiar designers, rising talent, new research, practical applications, art



Centre Pompidou: *La Fabrique du Vivant*, 2019, "Life's Factory," 56 objects and installations, survey selection offering a timeline.



Centre Pompidou: Veering towards the 'dark, dangerous, dank' impression, aesthetics of a cave

V&A Museum: *Fashioned from Nature*, 2018, (Edwina Ehrman): Chronological presentation, 300+ objects





Examination of fashion's mixed relationship with nature, highlighting impacts; including use of whalebones up to latest experiments in lab-grown materials

Cooper-Hewitt Triennale: *Nature*, 2019, (Lipps, McQuaid, et al): work from 62 different designers or teams, approximately 100 objects, organized by intention.





Nature— Cooper Hewitt Design Triennial

Designers are collaborating with nature, forging meaningful connections between humanity and the Earth. Their work is inspired by and intertwined with nature like never before. Reflective of our transforming relationship to the natural world. Compelled by a sense of urgency, designers look to nature as a guide and partner.

With projects ranging from experimental prototypes to consumer products, immersive installations, and architectural interventions, Nature—Cooper Hewitt Design Triennial, co-organized with Cube design museum, presents the work of sixty-two international design teams. Collaborations involve scientists, engineers, advocates for social and environmental justice, writers, and philosophers. They are engaging with nature in innovative and ground-breaking ways, driven by a profound awareness of climate change and ecological crises as much as advances in science and technology.


The exhibition themes explore seven strategies that designers are using to collaborate with nature—to understand, remediate, simulate, salvage, nurture, augment, and facilitate. The outcomes are speculative or practical and reveal new materials, creative methods, and inventive technologies. These provocations and solutions put forth by today's extraordinary design teams serve as encouragement for an enduring and more respectful partnership with nature.

This exhibition continues on the 3rd floor and in the Arthur Ross Terrace and Garden.

Nature is Cooper Hewitt's sixth Design Triennial and for the first time is co-organized. This exhibition is presented simultaneously at both institutions—in New York City and with Cube design museum in Kerkrade, Netherlands.

Nature—Cooper Hewitt Design Triennial is made possible by support from The Annelle Foundation. Additional support includes the Heckerling Exhibition Fund, the Eme Udden Exhibition Endowment Fund, and the Creative Industries Fund NL.

Funding is also provided by the Consulate General of the Netherlands in New York as part of the Dutch Culture USA program, and by the New York State Council on the Arts with the support of Governor Andrew M. Cuomo and the New York State Legislature.

 Large print exhibition labels available at the visitor experience desk located on the first floor.

#DesignTriennial

Organized around coherent themes representing INTENTIONS:
Understand, Simulate, Salvage, Facilitate, Augment, Remediate, Nurture



NATURE BY DESIGN: Selections from the Permanent Collection

To accompany the special exhibition *Nature—Cooper Hewitt Design Triennial*, this floor is devoted to *Nature by Design*: seven distinct stories drawn from Cooper Hewitt's collection, which spans thirty centuries up to the present. Throughout history, designers have observed nature, investigated its material and structures, and imitated and abstracted its patterns and shapes. Textiles, jewelry,

furniture, cutlery, and more show how designers have interpreted nature's rich beauty and astonishing complexity. Across scales from microscopic to monumental, and in forms familiar and unusual, we invite visitors to discover how nature and design have intersected in the past and continue to converge in our world.

Nature by Design is made possible by major support from Amita and Punamdu Chatterjee. Additional support is provided by the Cooper Hewitt Master's Program Fund.

Large Print

Large print exhibition labels available at the visitor experience desk located on the 1st floor.

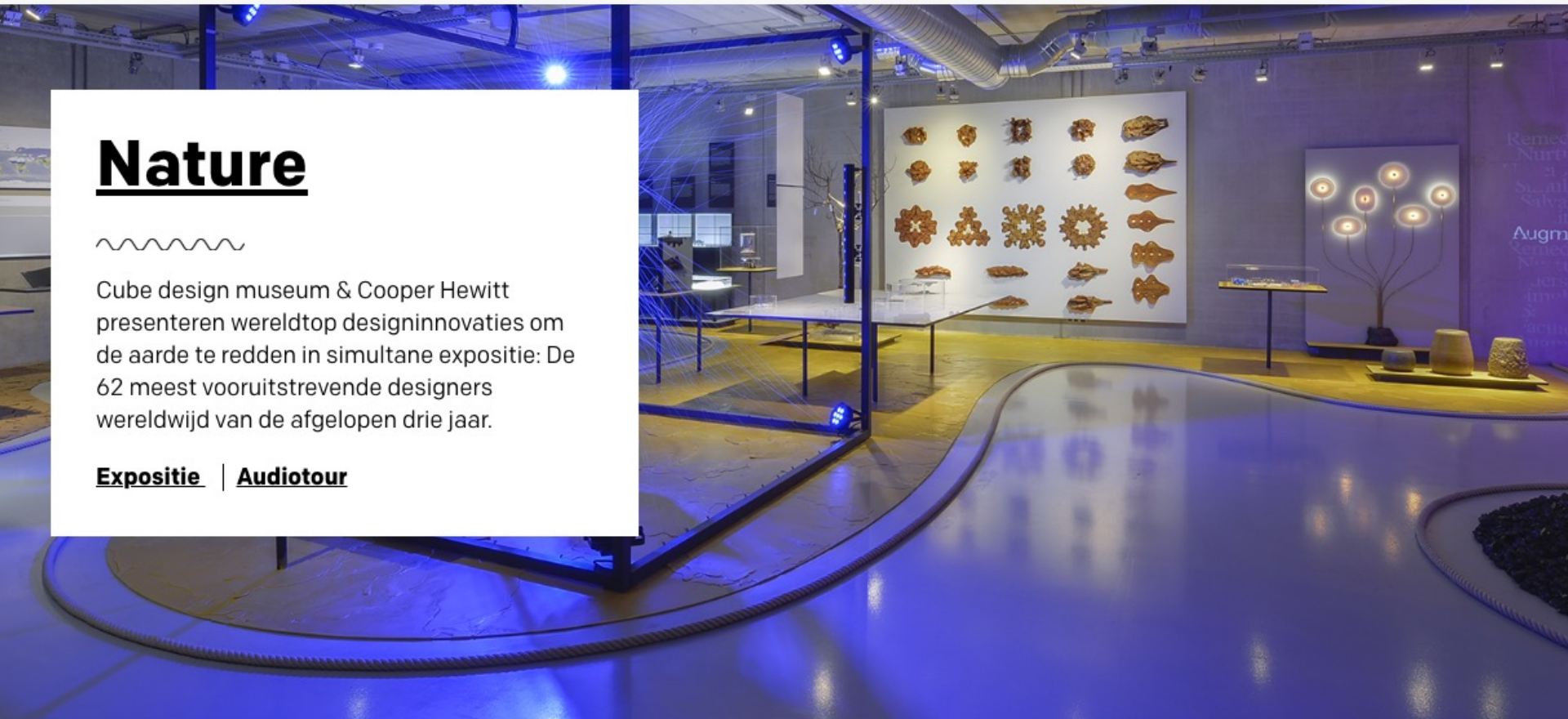
Middle floor between new content: categories of objects from the collection: Japanese Katagami, Embroidery, Paisley, Bathing Beautiful, Plastics (tortoiseshell), Opening in Fall: Botanical Lessons, Cochineal, After Icebergs, Botanical Expressions

Nature



Cube design museum & Cooper Hewitt presenteren wereldtop designinnovaties om de aarde te redden in simultane expositie: De 62 meest vooruitstrevende designers wereldwijd van de afgelopen drie jaar.

Expositie | **Audiotour**

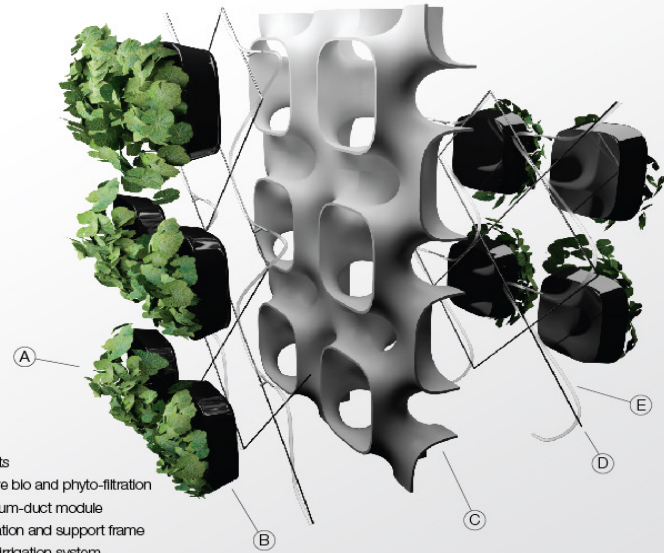
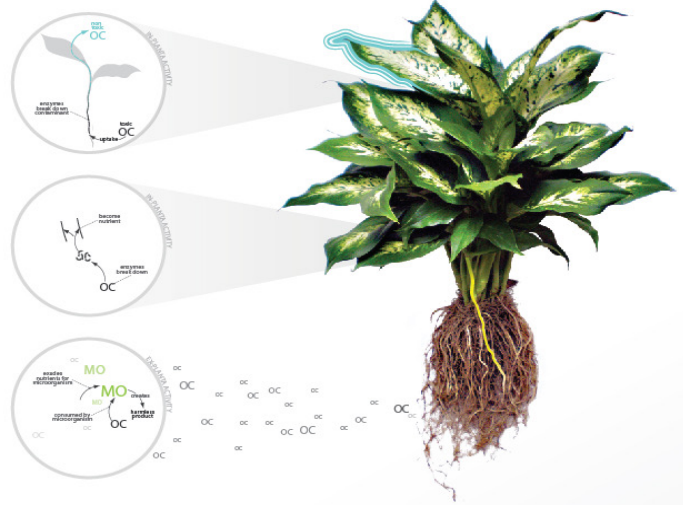


Collaboration

- Be aware of common hurdles (language, IP, work processes)
- Examine the publications of the person or lab
- Invest time in figuring out how to link your goals with the work of the lab



ACTIVE MODULAR PHYTOREMEDIATION SYSTEM (AMPS)



Collaboration Request: Email Sample 1

Hello Ms. Scientist Person,

I am a designer from the MIT Media Lab working on a groundbreaking project to integrate microbes that live on plant roots with traditional ventilation systems.

This concept could be a way to make current, inefficient, mechanical ventilation systems obsolete. This would directly benefit business and residents who rely on these systems, by dramatically lowering the energy consumption and maintenance cost of ventilation. As a bonus, using these plants and microbes together inside buildings looks beautiful and has a healthy, calming effect on people inside.

Since your lab works on some of these microbe species, can you help us with some analysis? We want to see how well these microbes absorb indoor air pollution. We have some preliminary figures based on research from Delft University, but need to build more evidence before we can apply for further funding, to scale this project up to have a meaningful impact.

I propose a call to discuss research and learn more about how we can work together next Monday. Can this work for you?

Best regards,

Collaboration Request: Email Sample 2

Dear Dr. (Name)

Congratulations on your having your recent paper on microbial absorption published in the journal *Nature*. This work has been illuminating for me and my collaborators at the MIT Media Lab on a project to apply such research to improve industrial design. In particular, your lab's findings about bacterial species that can absorb micro-particulates are like a missing link for us, as we try to use these species to extract pollution from indoor spaces.

Could we ask you a few questions about your research? It would be helpful to learn about how you managed to solve certain problems to support your experiments and arrive at your results. Also, if our project interests you, then perhaps we can discuss a collaboration. We are currently writing a proposal for funding from the Wellcome Trust and could potentially partner with your lab as co-applicants.

More about the project: we seek to harness the ability of microbes like the ones you study to absorb indoor air pollution by integrating them in plant fixtures. If successful, this design may replace energy-hungry, mechanical ventilation systems using industrial fans and filters. And our research finds that the natural plants have a positive psychological impact on the architecture's users.

Could you be available for a call to discuss on Thursday or Friday morning this week?

Thank you,

Conclusions

- Be skeptical of popular culture's representations of biodiversity
- Learn how to read scientific papers, know what journals to look at [begin with Nature and Science]
- Ask questions! Reach out to the scientific community
- Identify and understand keystone species, like oysters, ants, and beavers

"Provocative, and could well provide one viable answer to the
wake-up call that Rachel Carson sounded . . . in *Silent Spring*."
—SAN FRANCISCO CHRONICLE

BIOMIMICRY



Innovation Inspired
by Nature

JANINE M. BENYUS

Now a two-hour public television special on
The Nature of Things with David Suzuki

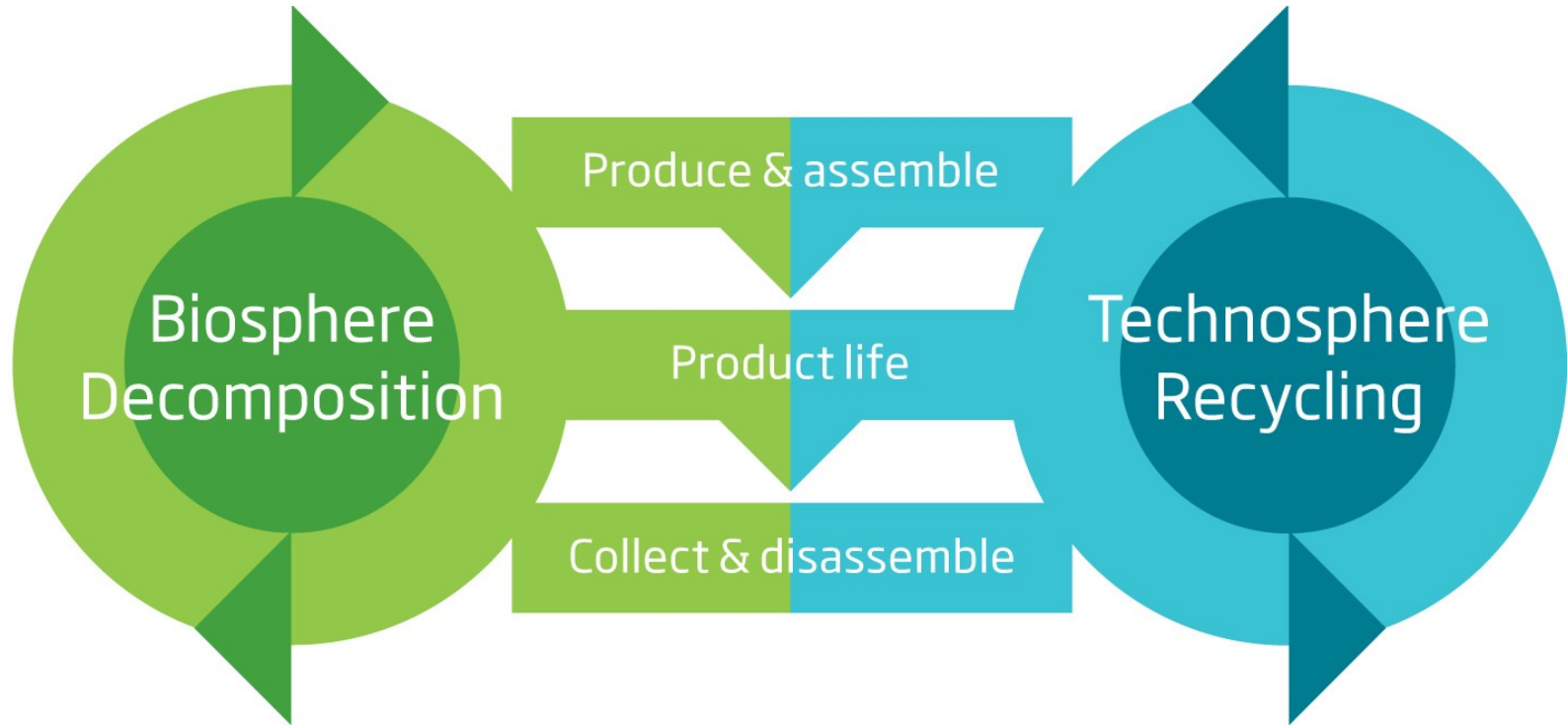
Remaking the Way We Make Things

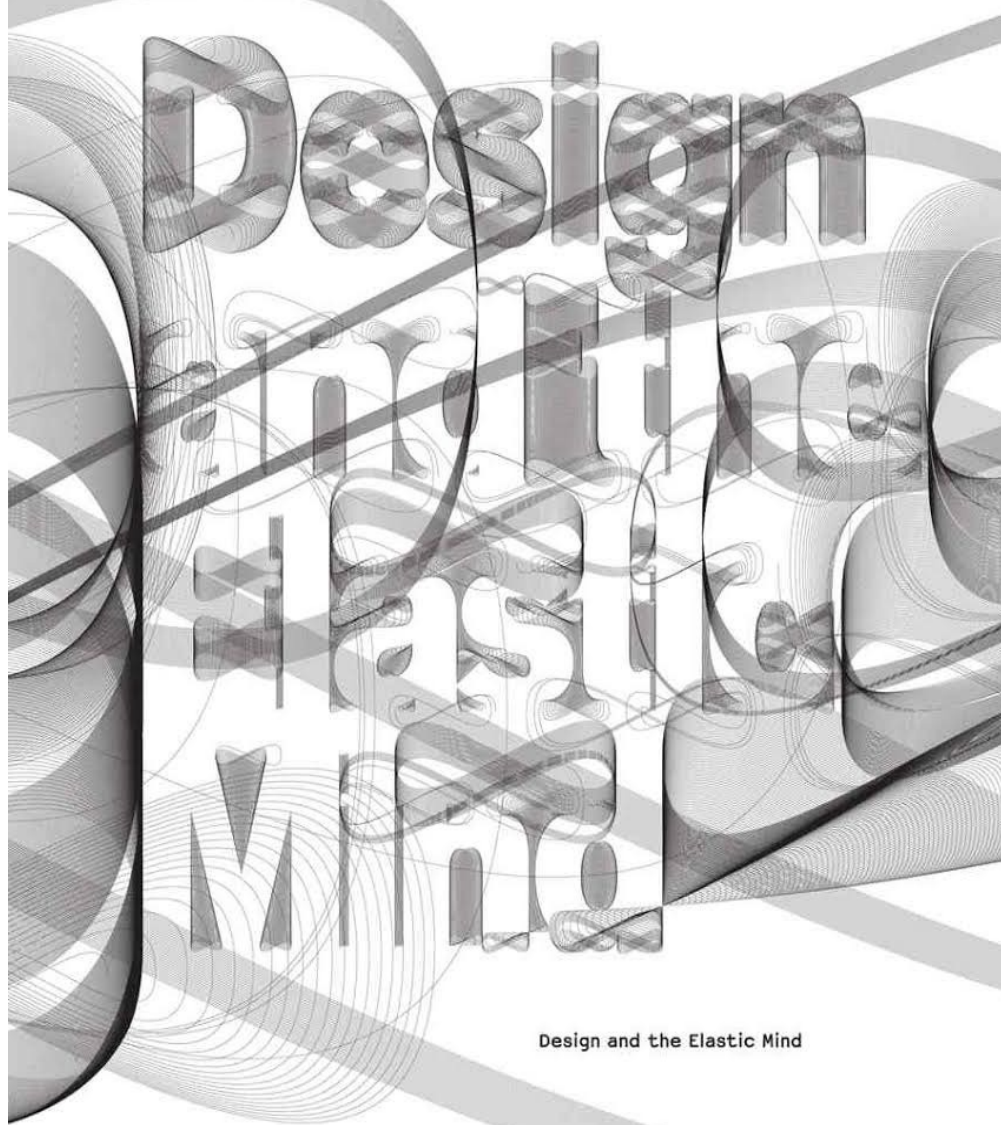
a concept that goes hand in hand with the notion of a technical nutrient: the concept of a **product of service**. Instead of products that are sold to consumers, products would be designed to be used for a **defined user period**—say, ten thousand hours of use. When they finish their useful life, they would be returned to the manufacturer or simply repaired or upgraded to a newer version. The manufacturer would retain ownership of the materials themselves. In order for such a scenario to be possible, products would need to be designed to be **upcycled** rather than recycled—to retain high quality in a closed-loop system. For example, a **serviclastic** computer case, for example, will continually circulate as a sturdy plastic component of these products, rather than being downcycled into a lower-quality product, like a car part or a medical device—instead of being downcycled into a product's feedstock for plastics and other materials. A **technical nutrient** is a material that is designed to go to the end of its useful life and be recycled back into the industrial metabolism from which it came. This scenario is a more practical one, however, because it allows for the possibility of repair and reuse. In this scenario, consumers would be paying for the use of the product, not for the materials themselves. When they finish using the product, the manufacturer would retain ownership of the materials themselves. This would allow the manufacturer to produce a concept that

cradle to cradle

currently, when an automobile is scrapped, its steel parts, along with other materials, are melted and recycled. However, this process is not a closed-loop system because the materials are lost to the environment. In a cradle-to-cradle system, materials are designed to be recycled back into the industrial metabolism from which they came. This would allow for the possibility of repair and reuse. In this scenario, consumers would be paying for the use of the product, not for the materials themselves. When they finish using the product, the manufacturer would retain ownership of the materials themselves. This would allow the manufacturer to produce a concept that

William McDonough & Michael Braungart





Design and the Elastic Mind

BIRKHAUSER

Ferdinand Ludwig
Daniel Schönle

Grow Architect ture

How to Design and
Build with Trees

THE A NOVEL
MINISTRY
FOR
THE
FUTURE

"ROBINSON HAS ESTABLISHED HIMSELF
AS THE GREAT HUMANIST OF SPECULATIVE
FICTION." —VILLAGE VOICE

"ONE OF THE WORLD'S FINEST
WORKING NOVELISTS, IN
ANY GENRE." —GUARDIAN

KIM STANLEY ROBINSON
NEW YORK TIMES BESTSELLING AUTHOR

Tips for Collaboration by Tony Cho

Free Download: www.biology-design.com

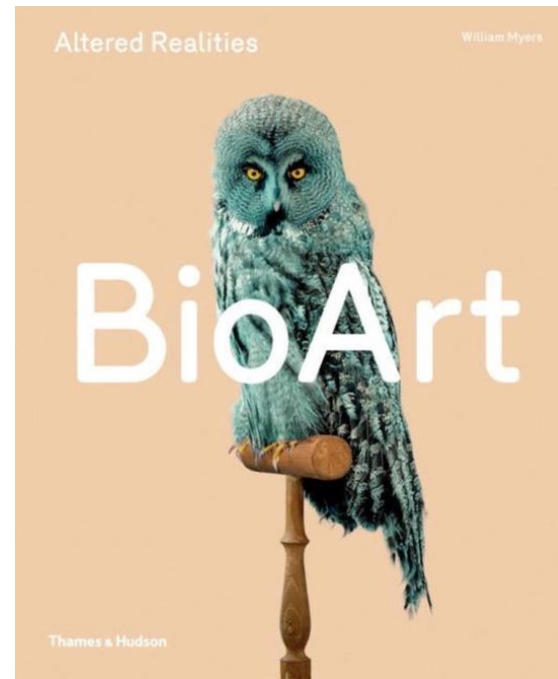
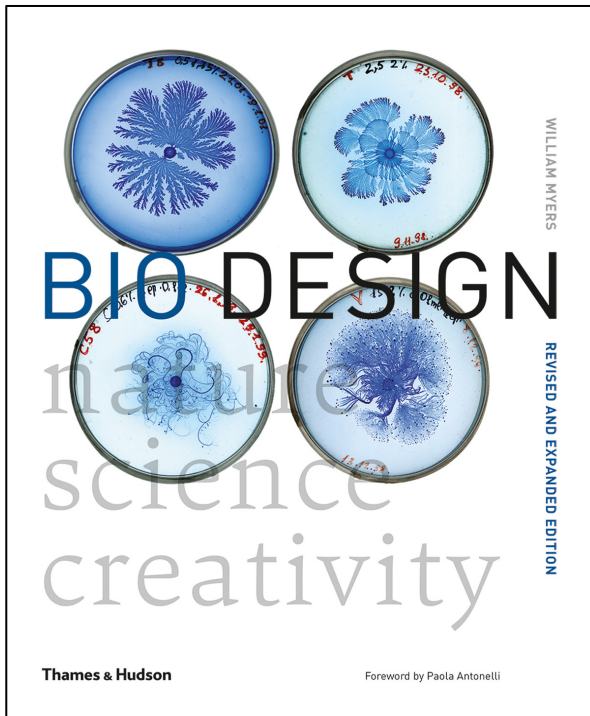
Includes:

FAQs

Further reading

Resources to check regularly, including journals
and website

www.m21d.org/education





Art ~ Science Collaborations: Examples, Potential, Resources,
Communication Tips

Open University: Utrecht, 15 March, 2024

William Myers

www.william-myers.com