DESIGN ETHICS: Towards Sustainable Futures

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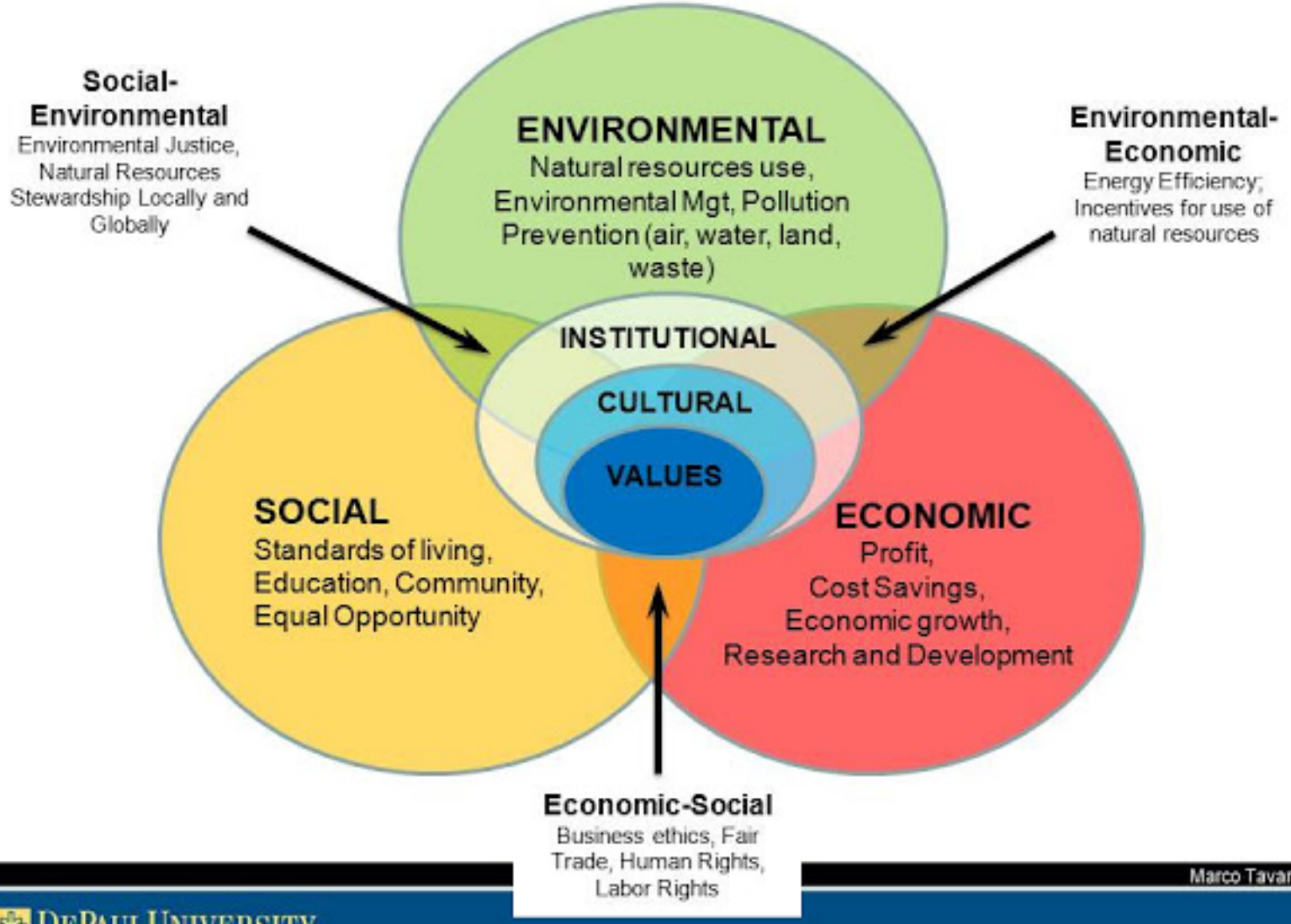
CHALMERS

Towards Sustainable Futures…
The Earth

"We have not inherited the Earth from our fathers.
We are borrowing it from our children."

Native American saying

The Sustainability Framework



What s an Environmental Worldview?

Environmental worldviews

- How people think the world works and what they think their role should be
- Human-centered: anthropocentric
- Life-centered: biocentric

Environmental ethics

- Deliberations about right/wrong and good/bad behavior in regards to the environment

G. Tyler Miller & Scott Spoolman (2017) Environmental Worldviews, Ethics, and Sustainability. CENGAGE Learning

Three Major Environmental Worldviews

PLANETARY MANAGEMENT

- We are apart from the rest of nature and can manage nature to meet our increasing needs and wants
- Because of our ingenuity and technology, we will not run out of resources
- The potential for economic growth is essentially unlimited
- Our success depends on how well we manage the earths life-support system mostly for our benefit.

PLANETARY STEWARDSHIP

- We have an ethical responsibility to be caring stewards of the earth
- We will probably not run out of resources but they should not be wasted
- We should encourage environmentally beneficial forms of economic growth and discourage environmentally harmful ones.
- Our success depends on how well we manage the earth's life-support systems for our benefit and for the rest of nature.

ENVIRONMENTAL WISDOM

- We are a part and totally dependent on nature, and nature exists for all species
- Resources are limited and should not be wasted
- We should encourage earth-sustaining forms of economic growth and discourage earth-degrading forms.
- Our success depends on learning how nature sustains itself and integrating such lessons from nature into the ways we think and act.

Fig. 25-2, p. 663


Environmental Worldviews Lie on a Continuum—from Self- to Earth-Centered

Fig. 25-3, p. 663

Levels of Ethical Concern

BIOSPHERE

BIODIVERSITY
(Earth's genes, species, and ecosystems)

ECOSYSTEMS

ALL SPECIES ON EARTH

ALL ANIMAL SPECIES

ALL INDIVIDUALS OF AN ANIMAL SPECIES

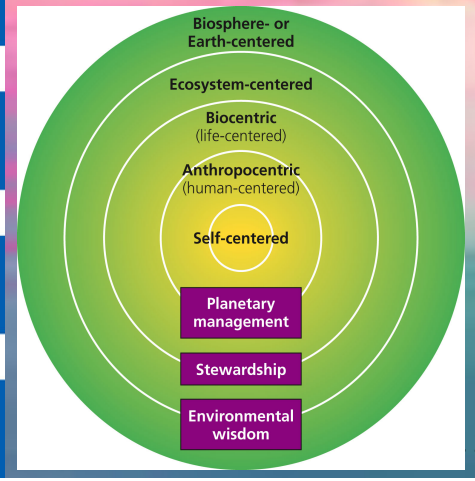
ALL PEOPLE

NATION

COMMUNITY AND FRIENDS

FAMILY

SELF



25-5, p. 665

A Vision for Sustainability

Environmental/sustainability revolution

- Major cultural shifts
- Environmental changes
- Social changes
- Technological changes
- Economic changes

We can change faster than we think we can!

Worldviews and Ethical Perspectives

- Individual beliefs towards ecology depend on ethical perspectives
- Most people have set of core values or beliefs
- Environmental concerns are a source for comparisons among different values and perceptions

Worldviews and ethical perspectives
A comparison

Philosophy	Intrinsic Value	Instrumental Value	Role of humans
Anthropocentric	Humans	Nature	Masters
Stewardship	Humans & Nature	Tools	Caretakers
Biocentric	Species	Abiotic nature	One of many
Animal rights	Individuals	Processes	Equals
Ecocentric	Processes	Individuals	Destroyers
Ecofeminist	Relationships	Roles	Caregivers

https://academic.oup.com/bioscience/advance-article/doi/10.1093/biosci/biz088/5610806
World Scientists' Warning of a Climate Emergency. Bioscience, 05 November 2019


DESIGN ETHICS


Design Ethics - The Aim
Identifying Ethical Issues
Ethics for Design (video)
Ethics for Designers Web Resources
Importance of Stakeholders
Values
New Technological Challenges

The aim

As the topic of Design Ethics is huge, what this lecture can do is to open the window with a view

Design constitutes moral practices

IF ETHICS IS ABOUT THE QUESTION OF HOW TO ACT, AND DESIGNERS HELP TO SHAPE HOW TECHNOLOGIES MEDIATE ACTION, DESIGNING SHOULD BE CONSIDERED 'ETHICS BY OTHER MEANS'.

EVERY TECHNOLOGICAL ARTEFACT THAT IS USED WILL MEDIATE HUMAN ACTIONS, AND EVERY ACT OF DESIGN THEREFORE HELPS TO CONSTITUTE SPECIFIC MORAL PRACTICES.

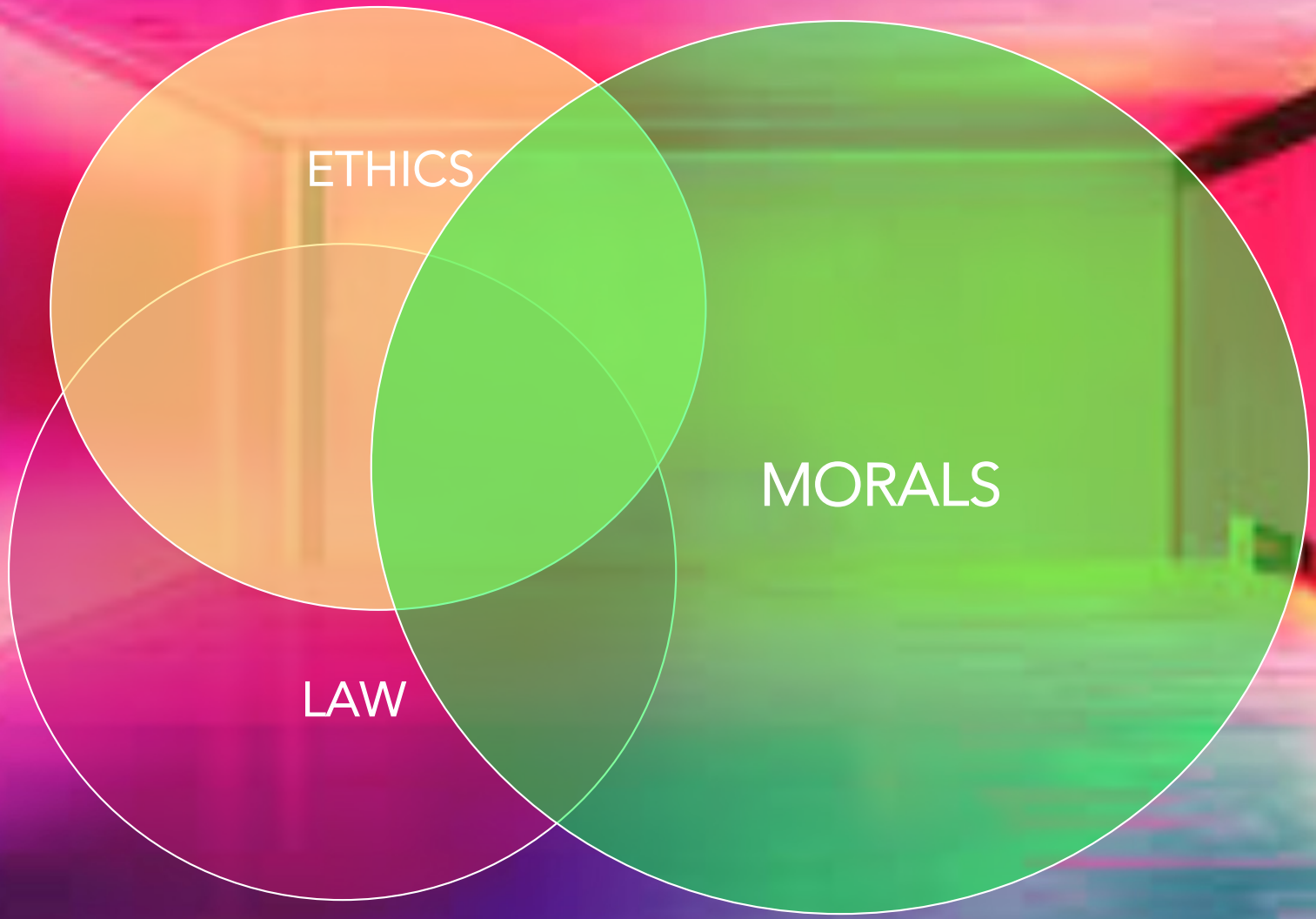
P.P Verbeek, What Things Do, 2009, p.69

Ethics and Morality

Morality: first-order set of beliefs and practices about how to live a good life.

Ethics: a second-order, conscious reflection on the adequacy of our moral beliefs.

Society, Values and Norms




Ethics
for Design
https://vimeo.com/232973887
12 designers and researchers from 8 European cities discuss the impact of design on our societies and the paths to follow for designers to work for the good of all.
1. What does a designer do?
2. Is there something wrong with design?
3. Ethics and Morality
4. How designers can do better?

Ethics for Design
1. What does a designer do?

- 0:00-4:20 James Auger, M-ITI, Madeira. Critical Design: Gravity battery- solar energy lifting mass – storing energy for later use
- 4:20- Alan Findeli, Nimes and Montreal Universities, Project laboratory. "Inhabitability"
- 08:27 Peter Bil'ak, Type and graphic designer, Typotheque, The Hague. Design for all: magazine by designers for all – affordable, social distribution

Ethics for Design
1. What does a designer do?

- 11:14 Design for values – Nicolas Nova, The Near Future Lab Geneva
- 11:43 Geoffrey Dorne, Design & Human, Paris. App for communication between refugees
- 13:08 Sarah Gold, IF London – privacy and security – The opportunity for design to come in and make a difference

Ethics for Design
2. Is there something wrong with design?

- 15:17

- 17:33-18:51 Sarah Gold:
  - Design is not taken seriously
  - Technology is moving too quickly
  - Rights we expect to have:
    - The right to be informed
    - The right of access
    - The right to rectification
    - The right to erasure
    - The right to restrict processing
    - The right to data portability
    - The right to object
    - Rights related to automated decisions & profiling

Ethics for Design
3. Ethics and Morality

- 19:24 – 21:09
- 21:09 -21:41 James Williams, doctoral candidate on attention ethics at Oxford University, Time Well Spent. Ethics as "the world it aught to be"
- 22:32 – 24:36 Matthieu Cherubi, Design technologist, Shanghai – machine ethics, car ethics

Ethics for Design
3. Ethics and Morality

- 27:37 – 28:01 James Williams: Technology helping us achieve our values
- 28:54 – 29:58 Sarah Gold: Beyond technological solipsism – awareness about other people's presence
- 29:58 -31:30 James Williams: Moving towards what we want to move to

Ethics for Design
4. How designers can do better?

- 31:30
- 31:46 -33:00 Matthieu Cherubi, Designing against your own ethical beliefs and values – Pizza robot
- 39:23 -40:30 Window of opportunity, Sarah Gold
- 41:39 43:44 Distractions of design like pollution of environment, James Williams
- 47:27 Juicy salif Lemon squeezer: vacuous design? https://www.independent.co.uk/property/interiors/the-secret-history-of-philippe-starcks-lemon-squeezer-1972849.html
- 48:03 – 49:00 Openness as a virtue, Sarah Gold
- 49:00 – 49:43 Care for the user, James Williams

Ethics for designers - web resources

https://usabilitygeek.com/ethics-in-user-experience-design/

ETHICS
for
Designers

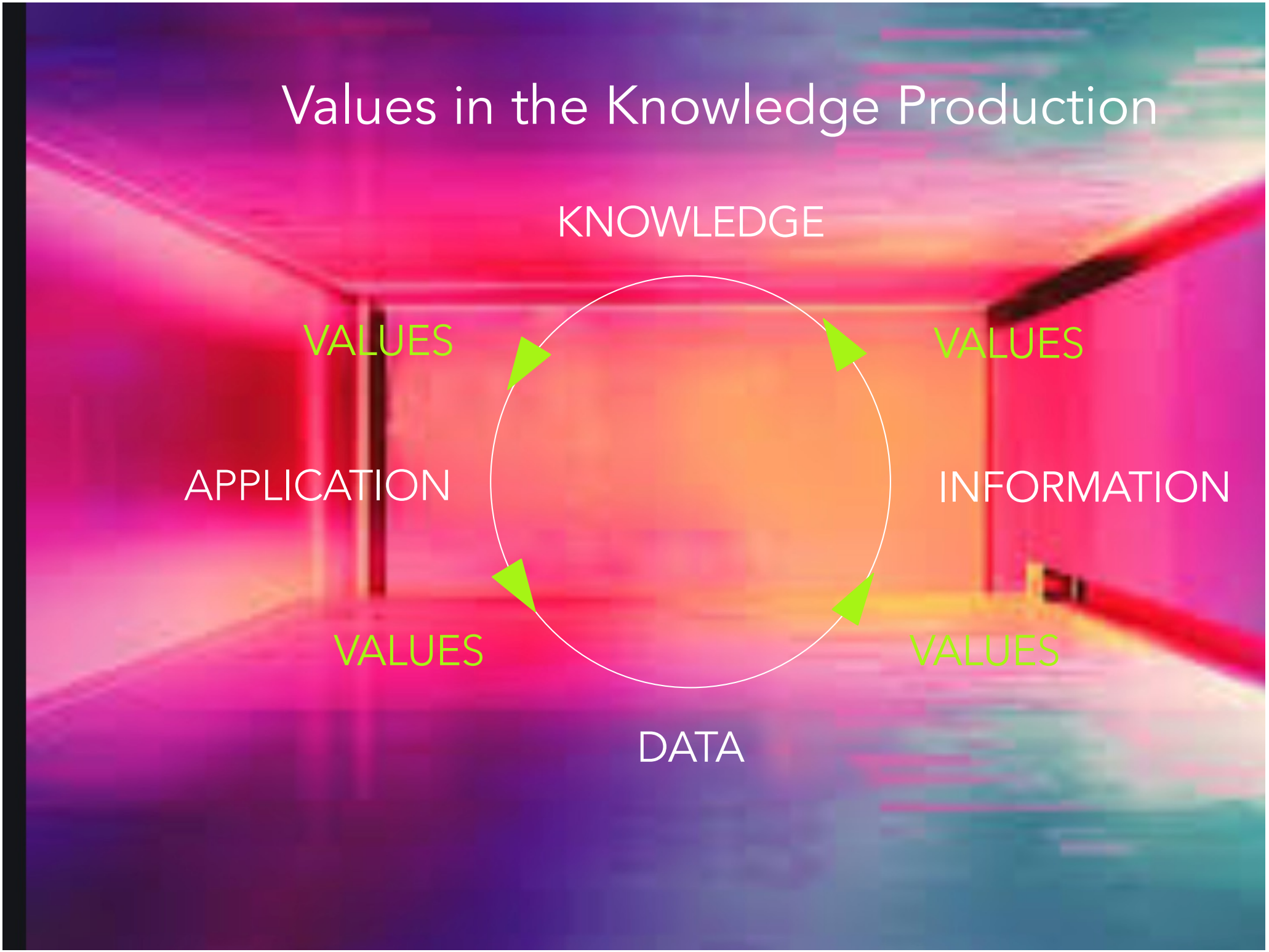
https://www.ethicsfordesigners.com/articles/

Values and ethics of knowledge

Based on the article:

Nancy Tuana (2015)
Coupled Ethical-Epistemic Analysis in Teaching Ethics. Critical reflection on value choices.
CACM VOL. 500 NO. 12. Pages 27-29

Values in the Knowledge Production



Values

Values serve as a guide to action and knowledge. They are relevant to all aspects of scientific and engineering practice, including discovery, analysis, and application.

Ethics in the Value-Sensitive Design Approach

Mary L. Cummings

Specific human values to be considered in the design process:

- Human Welfare,
- Ownership and Property,
- Privacy,
- Freedom from bias,
- Universal usability,
- Trust,
- Autonomy,
- Informed consent,
- Accountability,
- Identity, and
- Environmental Sustainability. [Environmental, Social, Economic, Technological etc.]
- Calmness [? Only? Perhaps Cognitive sustainability?]

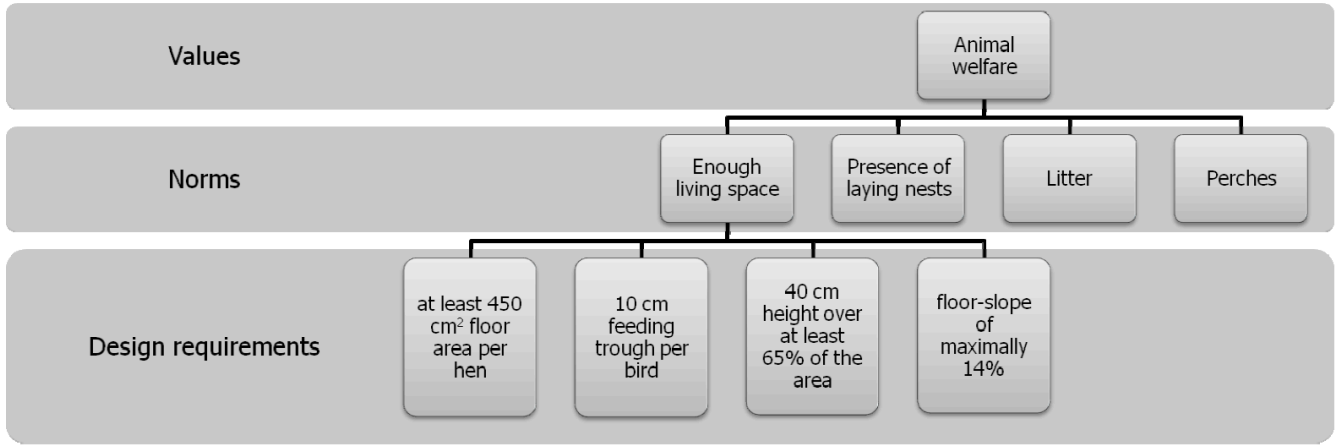
Requirement for transparency of values

Transparency of values is essential for trustworthiness and credibility of research. It is central to transdisciplinary research such as e.g. the National Science Foundation's Sustainability Research Network on Sustainable Climate Risk Management (SCRiM, http://scrimhub.org).

Coupled ethical-epistemic analysis helps to identify new and refined research topics, and inform modeling for multi-objective, robust decision making.

Values hierarchy

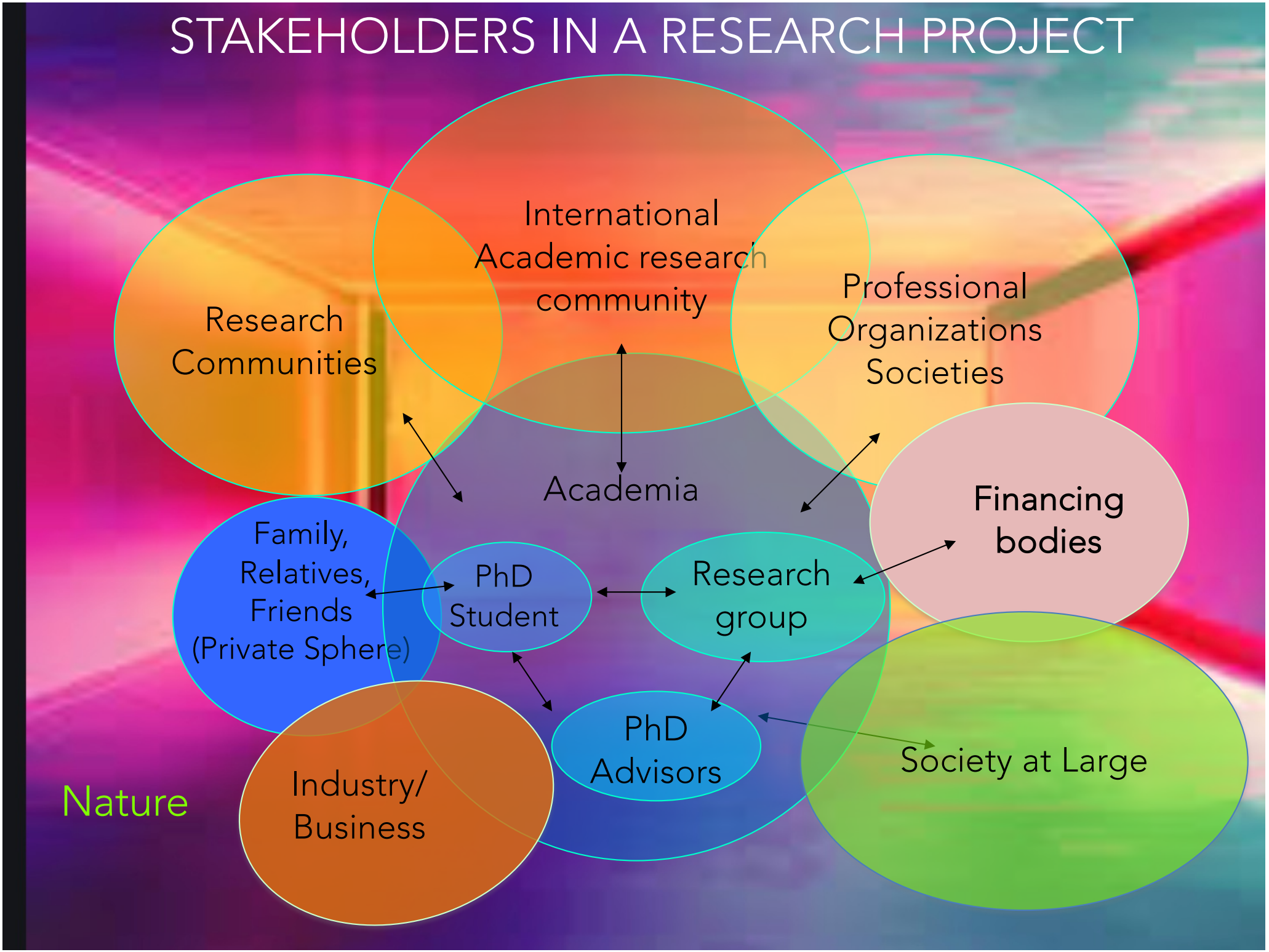
Example of values hierarchy



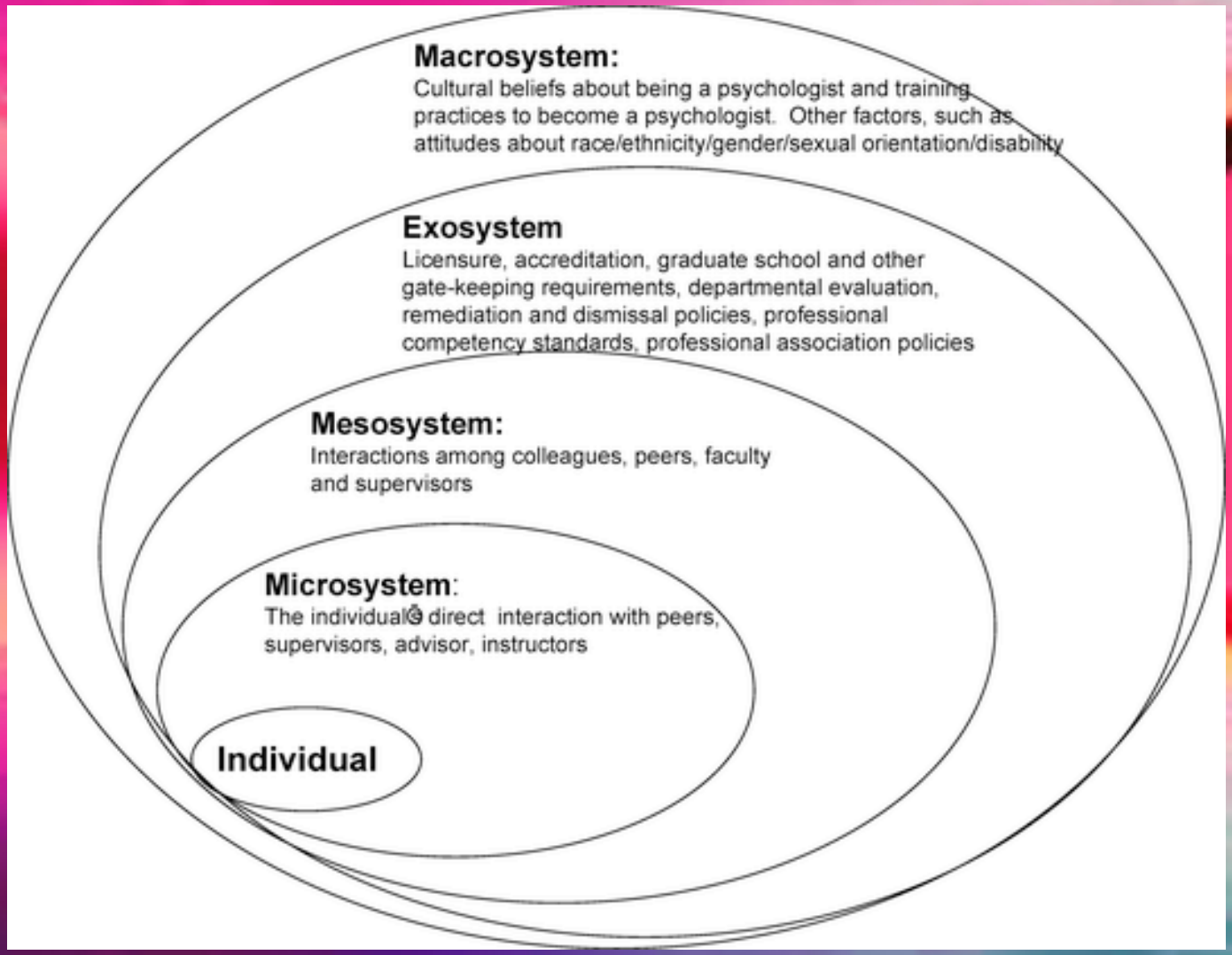
TU Delft

https://www.slideshare.net/philengtech/ibo-fpetvsd
Ibo van Poel: Value Sensitive Design: Four Challenges


Importance of Stakeholders


STAKEHOLDERS IN A RESEARCH PROJECT
International Academic research community
Research Communities
Professional Organizations Societies
Academia
Financing bodies
Family, Relatives, Friends (Private Sphere)
PhD Student
Research group
PhD Advisors
Industry/ Business
Society at Large
Nature

Domains of Ethics: Micro – Meso – Exo – Macro



The domain-based view in the analysis applicable to different types of problems – organization of society, sustainability of cities, ecology, economics, ethical aspects etc.
Source: American Psychological Association

New Technological Challenges

- Big data (Cambridge Analytica, Strava tracking app)
- Internet of things – internet of everything
- Intelligent cities
- Autonomous cars (Discuss: Uber Arizona crash)
- Autonomous intelligent software in control systems, information systems etc.
- Cyberphysical intelligent systems
- Adaptive (machine-larning) systems (such as ambient intllignce, traffic, decision-making)
- Sustainability (Environmental, Social, Technological, Cognitive) & Circular Economy

DESIGN OF INTELLIGENT ARTIFACTS

https://www.iconfinder.com/iconsets/brain-service-2

DESIGN OF INTELLIGENT ARTIFACTS

- Ambient intelligence
- Autonomous Intelligent Systems
- Intelligent Robots & Softbots
- Intelligent transportation
- Intelligent Cities
- Intelligent IoT
- Decision Making Algorithms


DESIGN
BIOMIMICRY &
Nature-Inspired
Technologies

BIOMIMICRY

Biomimicry is the practice of applying lessons from nature to the invention of healthier, more sustainable technologies for people. Biomimetic designers ("biomimics") focus on understanding, learning from, and emulating the strategies used by living things, with the intention of creating designs and technologies that are sustainable.

https://toolbox.biomimicry.org/introduction/

EXAMPLES OF BIOMIMETIC DESIGN

BURR

VELCRO

WHALE FIN

WIND TURBINE BLADE

SCALY PANGOLIN

WATERLOO INTERNATIONAL TERMINAL

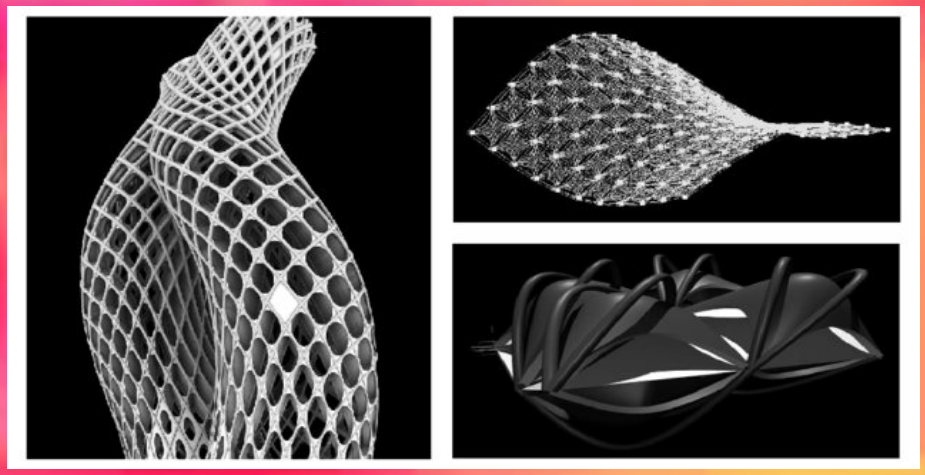
JAPANESE BULLET TRAIN

KINGFISHER

http://www.technologystudent.com/prddes1/biomimetic1.html

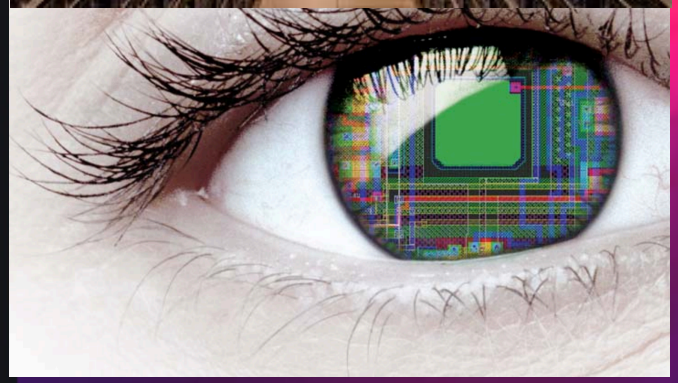
NERI OXMAN, MIT

Design at the Intersection Between Technology and Biology



https://www.ted.com/talks/neri_oxman_design_at_the_intersection_of_technology_and_biology/discussion?utm

MORE ENERGY EFFICIENT COMPUTING – NATURAL COMPUTING



Inspired by Nature

The human brain is millions of times more energy-effi cient and far more compact than a typical personal computer.

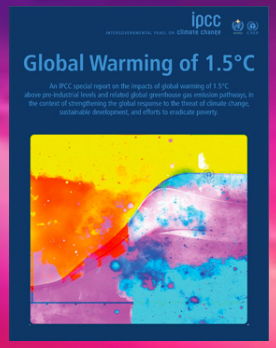
Neuromorphic microchips, which take cues from neural structure, have already demonstrated impressive power reductions.

Their effi ciency may make it possible to develop fully implantable artifi cial retinas for people affl icted by certain types of blindness as well as better electronic sensors.

Someday neuromorphic chips could even replicate the self-growing connections the brain uses to achieve its amazing functional capabilitie

http://cacs.usc.edu/education/cs596/Boahen-NeuromorphicChp-SciAm05.pdf

UN’s target limit global warming below1.5°C,above the pre-industrial level.



SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD

1 NO POVERTY

2 ZERO HUNGER

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

5 GENDER EQUALITY

6 CLEAN WATER AND SANITATION

7 AFFORDABLE AND CLEAN ENERGY

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10 REDUCED INEQUALITIES

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

17 PARTNERSHIPS FOR THE GOALS

SUSTAINABLE DEVELOPMENT GOALS

References

MATERIAL AND DIGITAL DESIGN SYNTHESIS

https://www.youtube.com/watch?v=JN7BUKb0OIA Programmable matter (video)

https://www.youtube.com/watch?v=lvtfD_rJ2hE&t=8s Amazing Technology Invented By MIT - Tangible Media (video)

https://www.fastcompany.com/3021522/mit-invents-a-shapeshifting-display-you-can-reach-through-and-touch MIT Invents A Shapeshifting Display You Can Reach Through And Touch (article + videos)

Hensel, Michael and Achim Menges (2006). 'Material and Digital Design Synthesis', *Architectural Design*, 76, 2, pp. 88–95
http://onlinelibrary.wiley.com/doi/10.1002/ad.244/pdf (article, illustrations)

http://icd.uni-stuttgart.de/?p=23559 Bio-based and Bio-inspired 3D-printed Shape-changing Material Systems (description)

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CYBER PHYSICAL MATERIALS

http://icd.uni-stuttgart.de/?p=23178 Cyber Physical Macro Material

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https://tangible.media.mit.edu/ Tangible media lab, MIT (information webpage)

https://engineering.princeton.edu/impact/robotics-and-cyberphysical-systems

Robotics and Cyberphysical Systems

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BIOMIMICRY

https://biomimicry.org/ THE BIOMIMICRY INSTITUTE

https://toolbox.biomimicry.org/introduction/ BIOMIMICRY

https://toolbox.biomimicry.org/introduction/biomimicry-film/ video on BIOMIMICRY

(3:47 on technology; 4:43 materials; 6:25 self-assembling; 7:29 carbon capture; 9:03 energy, swarm logic; 10:50 water; 14:18 toxic; 16:14 self-cleaning; 17:48 Structure; 18:56 the future)

https://youtu.be/3QZp6smeSQA TED (2010): Michael Pawlyn, USING NATURE'S GENIUS

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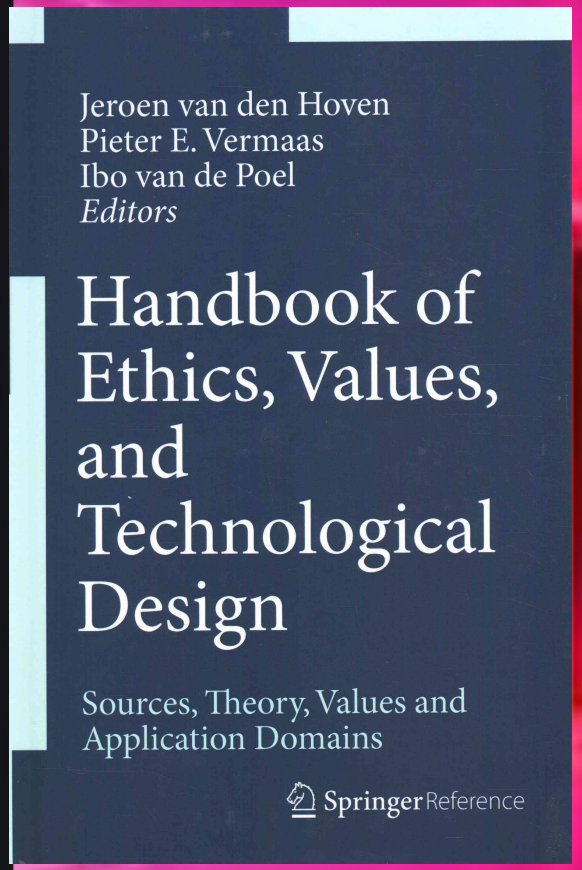

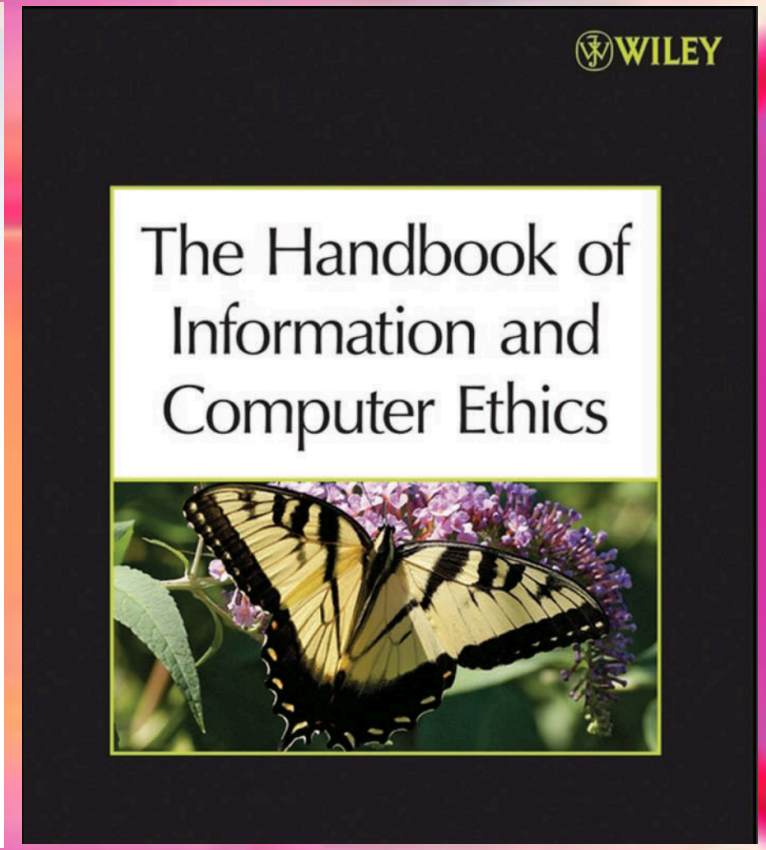

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