SOCIO-TECHNOLOGICAL ENGINEERING EDUCATION AT UNIVERSITIES OF TECHNOLOGY
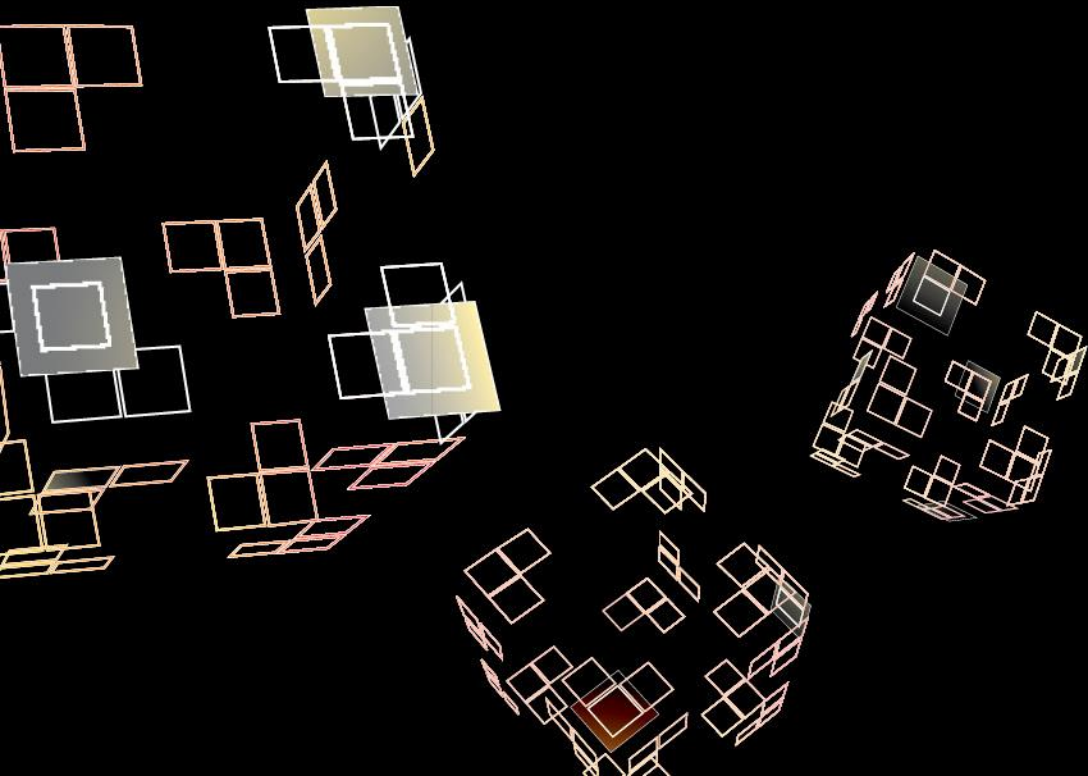
**PROF. (EM.) DR. STEFAN KUHLMANN
DR. KLAASJAN VISSCHER**

**40TH CONFERENCE

OF RECTORS AND PRESIDENTS OF

EUROPEAN UNIVERSITIES OF TECHNOLOGY

VIENNA, 23./24. SEPT. 2022**

**UNIVERSITY
OF TWENTE.**

OVERVIEW

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SOCIO-TECHNOLOGICAL TRANSFORMATION
A MISSION FOR UNIVERSITIES OF TECHNOLOGY

- Climate Change

- Changing geopolitical, global security and market conditions

- Science, technology and innovation for sustainable and democratic society and economy

- Social sciences and humanities to take centre stage at universities of technology

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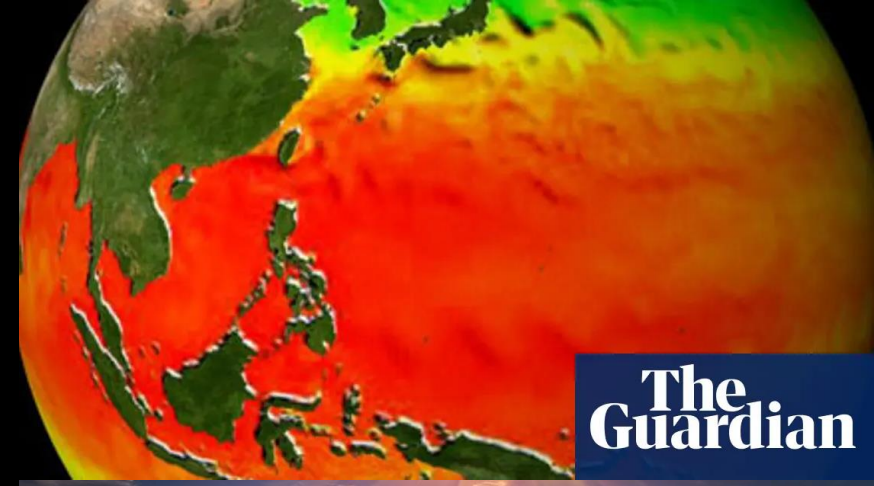
PROMINENT ROLE FOR SOCIAL SCIENCES
IN TRANSFORMATION

- Beyond "ethics of technology" as fig leaf !

- Beyond entrepreneurship and business management as technology marketing !

- Developing and designing technology for societal transformation towards sustainability and climate neutrality, in "configurations that work" (Rip and Kemp 1998).

- Understand, teach and design technology in context of institutions, regulation, markets, culture, and politics

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SOCIO-TECHNOLOGICAL ENGINEERING EDUCATION
SOCIETAL PROBLEMS AS GUIDING PRINCIPLE

- Students tend to overly identify with the promoters of new technologies and oversimplify stakeholder dynamics, leading to ineffective or irresponsible perspectives on technology development

- Start from students genuine interest to address global societal challenges

- Mobilize all related (inter-)disciplinary knowledge from engineering, social sciences and humanities

- At all levels (BSc; MSc; PhD) and across all educational programmes

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CHALLENGE-BASED LEARNING (CBL)
## SOCIO-TECHNOLOGICAL SOLUTIONS FOR SOCIETAL PROBLEMS

- CBL offers students the opportunity to work on wicked societal problems in multidisciplinary teams, including societal stakeholders

- Process goes over product, failing is part of learning, focus on content and skills development, documenting, sharing and reflecting

- See: 4TU. Centre for Engineering Education

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THEATRICAL TECHNOLOGY ASSESSMENT
A ROLE-PLAY APPROACH

- Playful simulation about complex stakeholder dynamics around emerging technologies

- Dealing with uncertainty (technological and societal risks and benefits, shifting evaluation criteria)

- Effective stakeholder strategies (collaboration, compromise, persuasion, power games, mobilizing support, etc.)

- Technology dynamics (innovation races, hype cycles, waiting games, deadlocks, stepping-stones, niche development, regime changes, etc.)

- See https://cta-toolbox.nl/tools/

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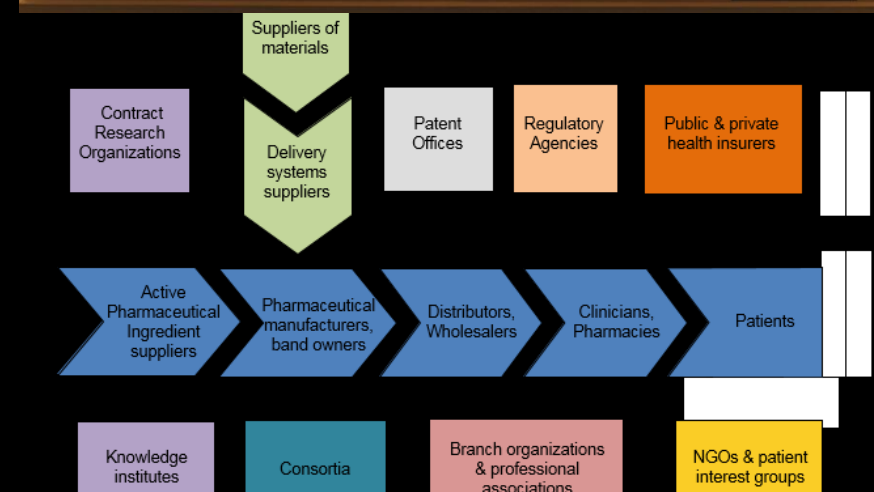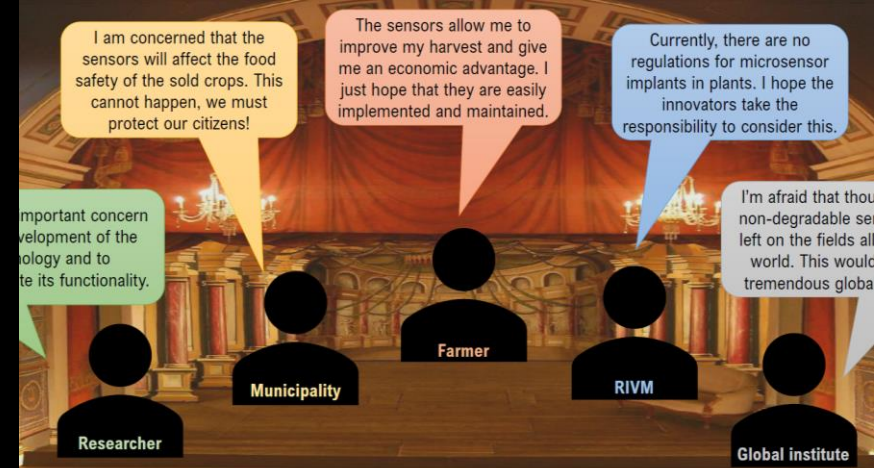
SHAPING RESPONSIBLE FUTURES

TRANSDISCIPLINARY MASTER INSERT

- The curriculum of the Master-Insert is designed for master students from all academic disciplines and is based on four pillars:
  - real-world challenges,
  - transdisciplinarity,
  - personal and professional development,
  - and self-directed learning.

- Winner of the Dutch Higher Education Award 2022

- https://www.utwente.nl/en/education/master/programmes/transdisciplinary-master-insert/

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DESIGNLAB UTWENTE

QUARTILE 2		QUARTILE 3
November - February		February - April
Transdisciplinary and Creative Ways of Working		*Leading Systemic Change*
Transdisciplinary Working (5 EC)		Change Making (5 EC)
Creative intelligence (5 EC)		Systems Thinking (5 EC)
Shaping Society and Responsible Futures		
Societal Leadership (5 EC)		Futurism (5 EC)

TUs NEED TRANS-DICIPLINARY EDUCATION
… AND RECTORS SHOULD PUSH THIS !

- Universities of Technology should embrace social sciences as constitutive element of their research and education …

- … and create curricula in which students (and teachers) with technical and social science backgrounds meet and learn to work together intensively, to fulfil the mission of socio-technical transformations.

- Rectors & boards must overcome resistance to transdisciplinary education,
  must create space for it and give support.

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THANKS!

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