CEO MESSAGE

“Our sustainability is founded on the basis of transparency, respect for the people and environment and the growth of our partners. For us, it is our way of creating value for stakeholders.”

What is sustainable engineering for?
What is sustainable engineering for?
What are engineers for?

Normativities materialize as directionalities
“[A] technical-social dualism lies at the heart of engineering expertise.”

Wendy Faulkner 2007

“describe quantitatively the relationship among measurable quantities, and then …use these descriptions to seek a region of optimal gain.”

Ken Alder 1997
“What has made the book a classic, I would argue, hinges on its rich and insightful account of the struggles between ‘progressive’ and ‘conservative’ engineers to remake the profession of engineering. . . .”

Its output was a “domesticated breed” that “convinced themselves that they served the interests of society as a whole . . . [but] in reality served only the dominant class in society.”
An interdisciplinary arena of critical scholarship?

(... including critical participation)?

Frustrations with STS . . .

*Technology and Heterogeneous Engineering: The Case of Portuguese Expansion*

*John Law*
Frustrations with STS . . .

Tacit Networks, Heterogeneous Engineers, and Embodied Technology
Author(s): Knut H. Sorensen and Nora Levold

While certainly the translation strategies employed by scientists have features in common with those applied by engineers, the discursive terrains where these translations are to be made are usually quite different.

Why not engineering?

1989

Beginning to carve a space

1994
But derivative inquiry . . .

Between social and cognitive
Between science and technology
Between labor and capital
Between continuity and change
Gender studies
-what’s specific about engineering?

(1) Identify/critique the dominant image: math. problem-solving=>
   design=> technology

1988-
1998

Not possible in CAD/CAM technologies
(2) Learning math. problem solving challenges students to divide the world into two parts

Engineering Selves: Hiring In to a Contested Field of Education
Gary Lee Downey and Juan C. Lucena

1991-1997

Study of engineering knowledge necessarily linked to study of engineers’ identities

(3) Engineers built to serve variable normative projects

1983-1995 => present

Localized normativities/directionalities
Critical participation => self-critical?
(4) PDS: Engineering as problem definition and solution

What are the normativities?
What are the directionalities?

2004=>present

Epilogue
Beyond Global Competence: Implications for Engineering Pedagogy

PDS:
Engineering as Problem Definition and Solution

19 participants

Diogo, M.Paula
Wu, C-Y
Akera, Atsushi
Jesiek, Brent
INES Mission

to advance critical research and teaching in
historical, social, cultural, political, philosophical,
rhetorical, and organizational studies of engineers
and engineering;
to help build and serve diverse communities of
researchers interested in engineering studies;
to link scholarly work in engineering studies to
broader discussions and debates about
engineering education, research, practice, policy,
and representation.

2005 UNESCO review
2006-2013 workshops

www.inesweb.org
Bibliography 480 entries

2011

2009

The MIT Press

2012

2007

Philosophy of Engineering and Technology

Editor-in-chief: Vermaas, P.
Goldberg, David; Selinger, Ezra, van de Poel, Ido (Eds.)
ISBN: 1845197734

2009

2010
The Prometheans' first meeting in 2005 was heralded by the announcement that "the engineering community and its cousin the engineering-education community remain important parts of SHOT's environment and valued segments of its membership." An engineering-education working group formed by members of this SIG is currently

2005


2009
Technical-social phenomena lie at the heart of engineering expertise
Technical-social phenomena lie at the heart of engineering expertise
--What are their normativities?
--What are their directionalities?

New image scaling up?
Valderrama et al.
“[W]idely recognized need for social responses to resource depletion, environmental deterioration and new energy technologies.”
“But this is not the first time engineering educators have attempted to bring social and environmental issues into the engineering curriculum.
New image scaling up?

Petersen
“[Sustainability is] a heterogeneous and contested set of perspectives that are continually defined and redefined through social, cultural, and political practices. . . . [It] cannot be viewed as a finite goal or destination we can work towards as a global community.

Solli
“[C]onsulting engineers’ opportunities to develop and provide sustainable services are shaped by a number of historic processes in the energy sector.”

Who is adding identities?

Sustainability, however, presents a new set of risks – and opportunities – that traditional ERM processes and systems may not yet fully identify or effectively manage. For the purpose of this report, we define sustainability as the social, economic and environmental risks faced by companies in a resource-constrained world.
Who is adding identities?

“Navigating standards” can . . . have two different meanings,
a) navigating between requirements and standards
   • economic optimizing
   • reflective swapping
b) navigating towards establishing new standards.”

Contested images?

Solli

“Navigating standards” can . . . have two different meanings,

of ‘materiality to whom’ must now encompass a wider range of stakeholders.
Who is adding identities?

Classification of Stakeholders and Priorities | We divide stakeholders into two categories: business and non-business stakeholders. The clients, employees and suppliers fall into the category of business stakeholders, while non-business stakeholders include shareholders, investors, local communities near project sites, future generations, non-governmental organizations and government agencies.

- 2011 Stakeholder Survey

<table>
<thead>
<tr>
<th>Employees</th>
<th>Clients</th>
<th>Suppliers</th>
<th>Non-business stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2 to 3 weeks)</td>
<td>Feb 11 to Feb 28 (for about 2 weeks)</td>
<td>Feb 16 to Mar 26 (for about 2 weeks)</td>
<td>Jan 11 to Feb 25 (for about 2 weeks)</td>
</tr>
</tbody>
</table>

Survey Period:
- Domestic: about 6,000 people
- Overseas: about 1,000 people
- Participation rates: 25%

- 7 clients (domestic and overseas)
- Participation rates: 25%

- Domestic: 100 people
- Overseas: 500 people
- Participation rates: 37%

- 180 people (domestic and overseas)
- Participation rates: 25%

Execution of the World’s First Lump-sum turnkey Contract for a Massive Gas Complex

CJR Office | Samsung Engineering established the CJR Office in 2011 to take diverse stakeholder opinions into account when making business management decisions. The CJR Office identifies sustainability management issues, performs relevant enterprise-level activities in cooperation with business and sustainability units, and reports the results to top management. Other functions of the office include raising employee awareness, channels of sharing information with external stakeholders, operational governance activities more systematic and to recognize our genuine social responsibilities and make the

The SNTV will be donated to the Al-Jubail community.
The opening of the compound will help us position ourselves as the “Great Company” that contributes to the development of local communities.
Contested images?

Lucena

“Group dynamics put in place by participatory methods (e.g., a community meeting) might lead to participatory decisions that reinforce the interests of the already powerful . . .”

Who is adding identities?

Table 3.2. Extent to which Different Systems Sizes Are Addressed

Maximum values for each system size (within 2 percent points) are shaded to indicate tendencies.

<table>
<thead>
<tr>
<th>System Size</th>
<th>Portion of Total Course Content</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Some*</td>
<td>None</td>
</tr>
<tr>
<td>Gate to Gate</td>
<td>27 (19%)</td>
<td>31 (32%)</td>
</tr>
<tr>
<td>Cradle to Grave</td>
<td>15 (24%)</td>
<td>35 (32%)</td>
</tr>
<tr>
<td>Inter-Industry Interactions</td>
<td>10 (54%)</td>
<td>25 (22%)</td>
</tr>
<tr>
<td>(Industrial Symbiosis)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extra-Industry</td>
<td>11 (54%)</td>
<td>33 (20%)</td>
</tr>
</tbody>
</table>

* Percentage of course content not specified by respondent, but topics within this system size selected
Contested images?

Valderrama et al.
“It may just cover a specific set of metrics, methods or technically preferred solutions . . . include a broader perspective on how planning is performed in a more interactive and integrative fashion, or . . . raise demands for engineers to be able to analyse societal challenges . . . .

Contested images?

Klimek & Næss
“The interviewees were mainly educated as engineers and the majority was employed in industry as industrial scientists.”
“Process engineer: ‘I know some prototype engineers who say that [climate change] is nonsense, because there is no problem.’”
Critical participation?

Petersen
“[Adding new competencies is] insufficient when it comes to enabling engineers to work with sustainability at the more complex societal level.”
“reflective design practice”

Lucena
“Through collaborative faculty workshops . . .”

Valderrama et al.
“[A] separate masters . . . sustainable energy planning and management.”

Will it become core?

Valderrama et al.
“[What might be the case] when the sustainability challenge enters into both the core of technological knowledge and the priorities concerning future societal change?”
Contested normativities?
Contested directionalities?
What is sustainable engineering for?