

FUTURE OF SCIENCE AND TECHNOLOGY IN SOCIETY:  
SYMPOSIUM IN HONOUR OF ARIE RIP

University of Twente, 16 – 17 June 2011

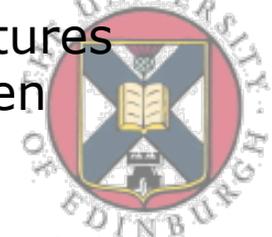
**Bridging the big divide:  
on the uneven gaze of Science,  
Technology and Innovation  
Studies**

Professor Robin Williams  
Institute for the Study of Science,  
Technology and Innovation (ISSTI),  
The University of Edinburgh



# Overview

- Science, Technology and Innovation Studies has been fragmented between work oriented towards promotion versus control
- Rip and Schot's *Constructive Technology Assessment* and subsequent concepts sought to overcome this divide
- Attempts by STIS researchers to anticipate techno-social futures have often been disappointing; extrapolated from a limited and somewhat stereotypical set of narratives, centred on risk, and projected, sometimes unreflexively, from previous episodes of technological change
- The STIS community needs to consider how we may get bound up with public discourse, policy frameworks and funding opportunities and deliberately or unintentionally reproduce social science fictions
- Can we learn from other academic traditions which have been more adventurous in their engagements with techno-futures eg end-user innovation; eg playful engagements between technologists and artists?



# Caught in the novelty trap?

- *The Novelty Trap* (Rayner & Martin 2004) where “ambitious claims for revolutionary innovation are met by sceptical concerns about unintended consequences and new risks”
- *Compressed foresight*: Where emerging techno-scientific potential projected as imminent and delivering radical (benign or malign) change.
- Contrast revolutionary and transgressive potential of projected uses and implications of NEST to the *banality* of emerging applications



# The Collingridge dilemma

- At the initial stages of a new technology, knowledge about its consequences (including undesired outcomes) is limited. It is therefore difficult to win support for public intervention and control.
- Later we have more systematic knowledge about costs and benefits of technology; by this stage, change is costly and difficult to achieve; technology is entrenched; must confront powerful vested interests

David Collingridge (1980) The social control of technology



# Constructive Technology Assessment

- the need to extend assessment and intervention upstream to earliest stages of an innovation, when choices in innovation pathway are relatively open and fluid – and could readily and cheaply be adjusted
- scope for societal intervention to secure benign outcomes or defer critical choices
- Idea of Constructive Technology Assessment opens up productive stream of conceptualisation (SNM, MLP, TM etc)



# Anticipating the outcomes of new and emerging S&T?

Rip and te Kulve (2008:50): consider how to anticipate the technical and social outcomes of New and Emerging Science and Technology (NEST) eg nano-science and techs

- “most of the envisioned applications are still in the realm of science fiction, in the sense that they are not there yet, and that it is not clear whether they will ever be realized. Their eventual impacts are even less clear – attempts to find out about them are then **social science fictions.**”
- They call for “socio-technical scenarios which capture ongoing dynamics and develop implications for what might happen.”

*Are we in a position to capture dynamics and implications?*



# Difficulties in prospective intervention

- (Williams et al., 2005) “the initial conceptions of the applications and social implications of a technology are often so far removed from ultimate outcomes as to be uninformative”
- Eg Lasers as “death weapons from space”  
c.f. for reading barcodes or DVDs!
- attempts to control technology based upon inappropriate models of their social significance can have unhelpful and counterproductive consequences.  
*Eg Trade Union strategies for Computer Aided Design*
- Thinking back from the future – with hindsight, what kinds of intervention would have been helpful today/tomorrow?



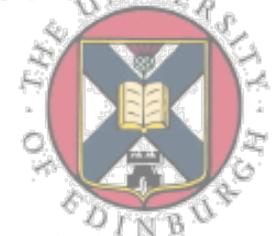
# Uneven-ness of STS gaze

- Orientation to health and environmental risk – we are less well-equipped to discuss other risks and social benefits (social needs?)
- Prevalence in public and media discourse and many STIS accounts of rather stereotypical images of the social implications/risks of NEST
- Re-running with nano/GM earlier controversies – over e.g. nuclear power, green revolution
- Entrenched narratives become projected onto technologies: serve as “Rorschach tests”
- Risk that STIS commentators get bound up with particular social science fictions



# Uneven-ness of STS gaze

- uneven attention paid to different techno-scientific domains.
- 1980s *The Robots Are Coming* – but Programmable Logic Controllers ignored
- 2011 – Synthetic Biology - google search
  - ◆ "sociology of synthetic biology" 21 hits
  - ◆ "sociology of systems biology" 4 hits
  - ◆ "synthetic biology jobs" 38,400 hits
  - ◆ "systems biology jobs" 119,000 hits.
  - ◆ The g-method index (® Williams) suggests a 15 fold bias of sociological attention in favour of synthetic biology over systems biology.



# Uneven-ness of STIS gaze

- We focus our attention on technoscience that seems edgy – that mobilises hopes and fears
- Public – and social science – imagination readily engaged where complex technoscientific developments can be boiled down to essence that can readily be grasped and conveyed and that matters socially
- STIS community must reflect more upon how our research is conditioned by the availability of funding, policy agendas and public perceptions.



# Resources for anticipation?

- Our ability to anticipate remains rather feeble
- Are we just generating a richer array of narratives?
- How can we make measured and proportionate links between technological development and social implications: current and emerging?
- can we draw upon different sets of resources?
  - ◆ Working-up from development practice
  - ◆ Playful couplings – artists at play; users at work?
  - ◆ Different models of innovation - configurations



# Working up from engineering and development practice

Experience as social scientists working in development teams

- Partial appropriations of user and use
- Become more grounded as product approaches commercialisation
- Intermediate as well as final users –
- Products may be generic in relation to particular uses that emerge
- Difficulties where social scientists are asked to make simple connections between upstream technical choices and social implications



# Playful couplings between technology and society?

- direct engagement between technical specialists and artists
  - ◆ leading to new forms of art?
  - ◆ novel representation of technology and its implications
- Growing attention to user-driven innovation
  - ◆ Enthusiast-user:developer barriers eroded
  - ◆ Some applications eg P2P readily ported to many social groups



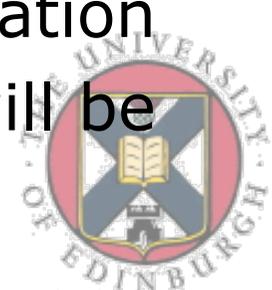
# Different models of innovation

- Collingridge dilemma applies to technology *qua* **system** – inflexible, stable – eg Nuclear Power
- Later Collingridge (1992) <<inflexible technologies emerge in inflexible institutional settings>> – we need to “hedge and flex”
- Fleck (1988) configurational technologies – user artfully selects and combines array of off-the-shelf and custom components to meet particular purposes – highly flexible
- Many contemporary technologies are designed to be configurational/flexible in application



# Upstream – downstream?

- Accept that our ability to anticipate is necessarily partial and uncertain
- Identifying patterns from previous episodes
  - ◆ Hype cycle
  - ◆ Lead times are typically very long – version II
  - ◆ Engineers view: “information solves problems”
  - ◆ What was transgressive in elite institutional hands often becomes commonplace in hands of many (eg defence > corporations > mass users)
- Strongest evidence downstream - trials and post-launch: large-scale social experimentation
- Identify moments where late regulation will be ineffective/risky



# “better technology in a better society”?

- Thoroughgoing ***socialisation*** of publicly supported technoscientific development programmes
  - creates new spaces for social learning
    - ◆ interdisciplinary centres of excellence
    - ◆ technology platforms
    - ◆ Attention to interoperability; test-beds, living labs etc.
    - ◆ as well as ‘Public Engagement’ exercises
- Responsible innovation



# Where might we not want to let the consumer choose?

- risks which are not known/readily appreciated;
- collective risks not experienced or perceived as sufficiently hazardous by the individual to deter adoption on the grounds of self-interest but sufficiently large to motivate collective action;
- outcomes which are seen as unacceptable to 'society' though accepted/desired by individuals/groups (e.g. breaching religious codes);
- externalized costs (e.g. the undermining of public transport by the private car or likewise of public phone provision by the adoption of mobile phones)
- Lock in/infrastructure change

