How did we get here?

Richard I. Cook, MD

Professor of Healthcare System Safety

e-mail: rcook@kth.se

cellphone: +46 70 190 42 16

skypname: richardcookmd

wesbite: www.ctlab.org

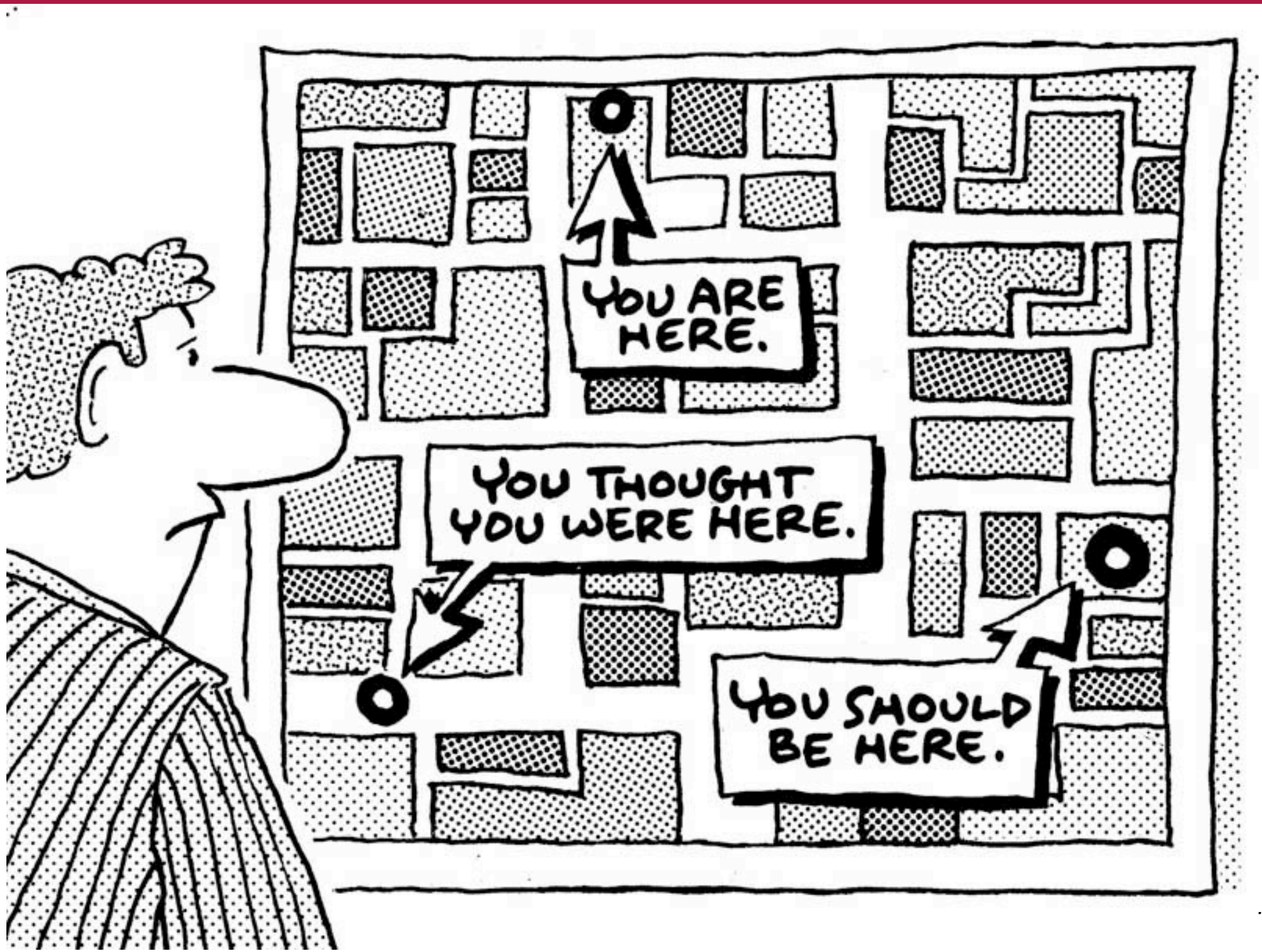
This is who I work for

Skolan för teknik och hälsa (STH)
Kungliga tekniska högskolan (KTH)
Stockholm, Sweden

This is my campaign→

save lives
stop
incident
reporting

This is my stuff→


YOU ARE HERE.
YOU THOUGHT YOU WERE HERE.
YOU SHOULD BE HERE.

Resilience is the story of the accident that **didn't** happen.

Resilience is the **second** story.

$$\text{resilience} = \frac{1}{\text{brittleness}}$$

- Safety is an emergent property of system structure and function.
- *Attention* to safety is a byproduct of accidents.
  - attention ∝ Size x recency x ‘distance’
- The meaning of accidents is inferred and contested.
- Organizations struggle for inference dominance.
- It’s proven a lot harder to make progress on safety than anyone is willing to admit.

These conditions do not tend toward enlightenment.

1. Performance *at all scales*...
   ...is sometimes very much *better* than expected.
   ...is sometimes very much *worse* than expected.

2. People *purposefully* shift goals and change activities in response to novel, disruptive, or risky situations.

3. Adaptation is crucial to success.

4. Centralized control creates brittleness.

5. Unpredictable environments penalize brittleness.

Systems timeline

Railroad appliance safety act in force

Taylor: *Principles Management*

Juran: *Quality Control Handbook*

Deming: *Quality, Productivity, and Competitive Position*

Six-sigma

Total Quality Management

Cook: *Tale of Two Stories*

IOM: *To Err is Human*

1900 1911 ww1 ... 1982 1992 2004 2013

Strategic bombing survey

Nuclear accidents

Apollo 1

Three Mile Island

Fukushima

1st Resilience Engineering Symposium

MEDICARE

Challenger
Chernobyl

NPSF

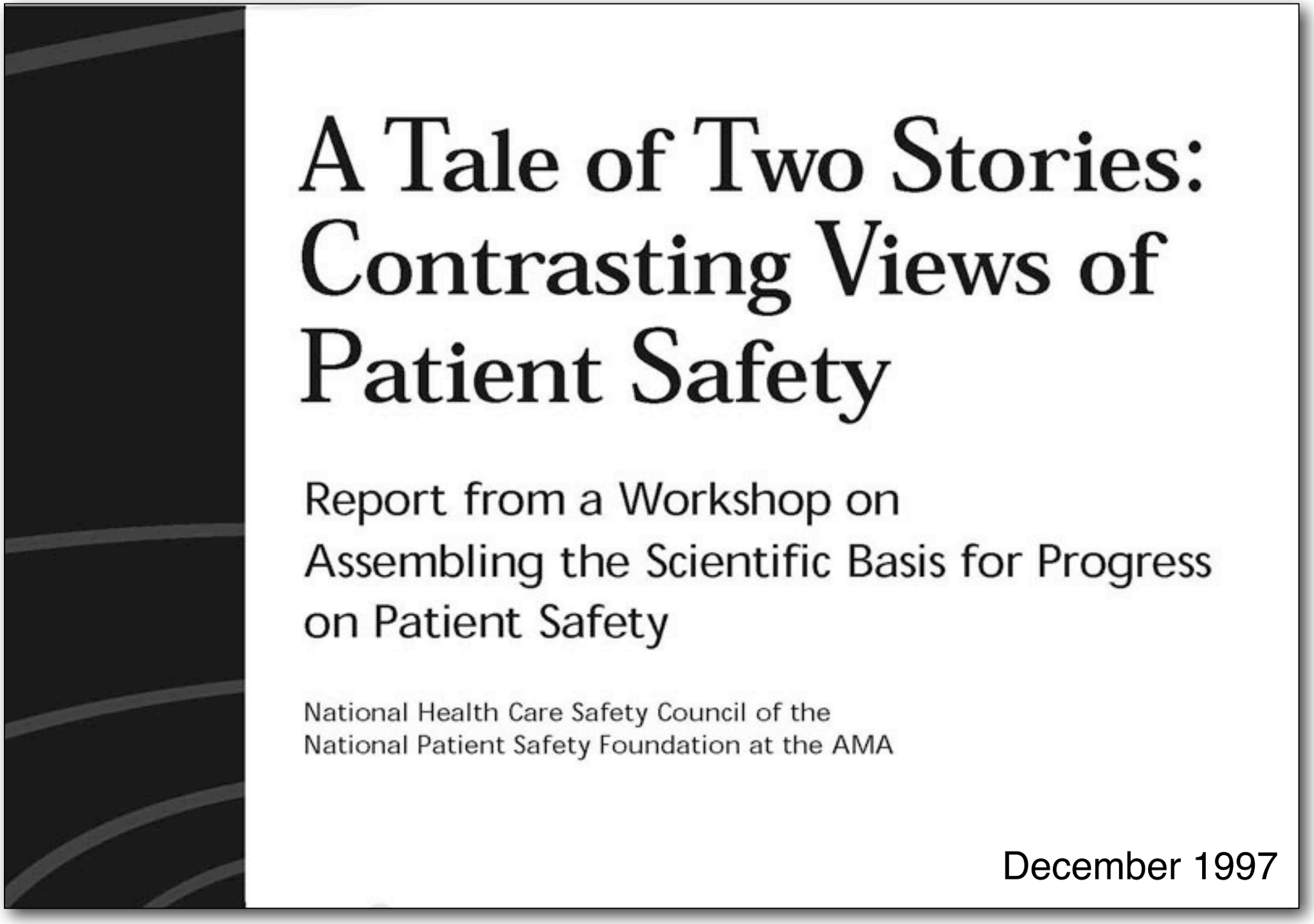
1st Annenberg conference

Ben Kolb, Willie King

Betsy Lehman, Vince Gargano

Libby Zion

We owe it all to Three Mile Island



available at *www.ctlab.org*

First stories:

> "...a kind of story we... tell after the fact in order to learn from the failure and to decide what kinds of changes are needed. In telling that story, stakeholders focus on a few of the factors and actors that could be seen as contributing to the sequence of events."

Second stories:

> "...examine how changes in technology, procedures, and organizations, combine with economic pressures to create new vulnerabilities and forms of failure at the same time that they create new forms of economic and therapeutic success."

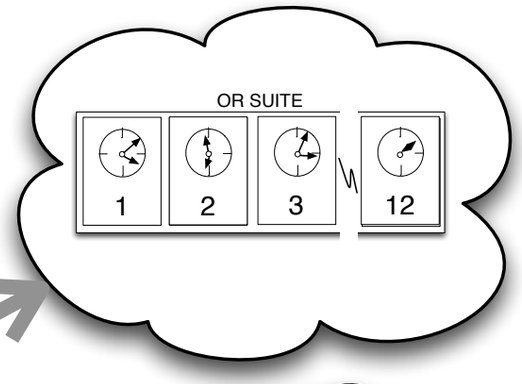
"... changes... create opportunities and vulnerabilities also encourage human adaptation to exploit opportunity and defend against vulnerability. Individuals, teams and organizations adapt their practices and tools to guard against known threats to safety.

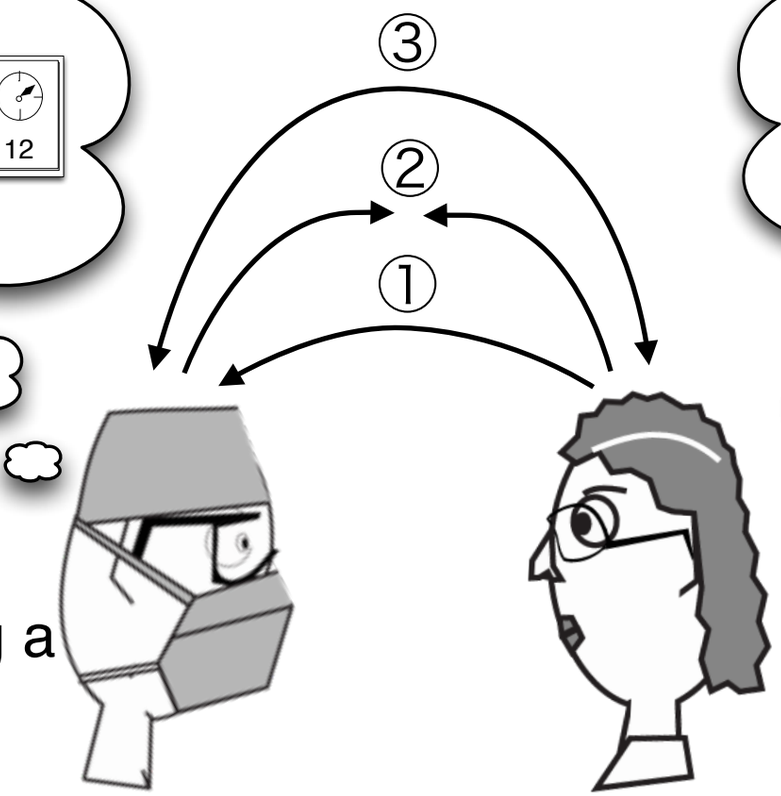
But complexity limits the success of these adaptations.

Hazards are hidden, tradeoffs difficult to assess, and the coupling across seemingly distant parts is obscured."

case: "soft" emergency

Cook & Nemeth, Taking things in one's stride",
Hollnagel et al., *RE: Concepts and Precepts*





anesthesiologist

surgeon

- why is it an emergency?
- consequence of bumping a room for today's work?
- what leverage do I have
- how do I maintain good relationship with all the Ss?

Deeper knowledge
- how long to get the patient to the OR?
- how long before a room becomes empty?
- how fast is this surgeon?
- what else is pending?
- how truthful is S?

Deeper dependency
- nurse & anesthesia staffing
- different room geometries
- precedents and policies
- other obstacles

1. demand
2. negotiation
3. agreement

deep socio-technical structure

- how sick is this patient?
- what else do I have to do today?
- what leverage do I have?
- how do I maintain good relationship with A?
- what are the rules?

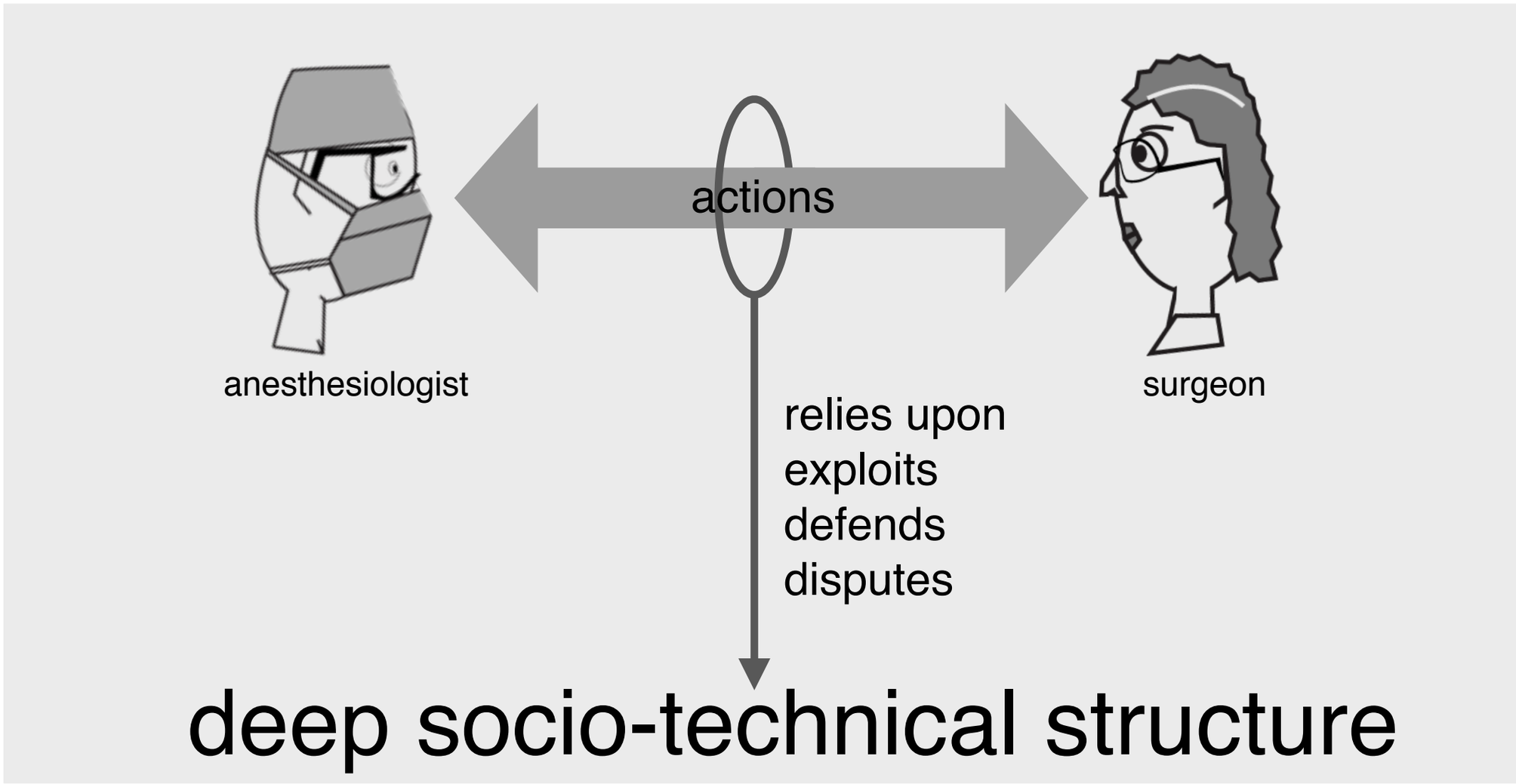
Deeper knowledge
- how will the patient's condition change with time?
- what happens if I don't push hard
- what is happening in the other ORs?
- how long to get the patient to the OR?

Deeper dependency
- resident staffing
- different room geometries
- precedents and policies
- other obstacles

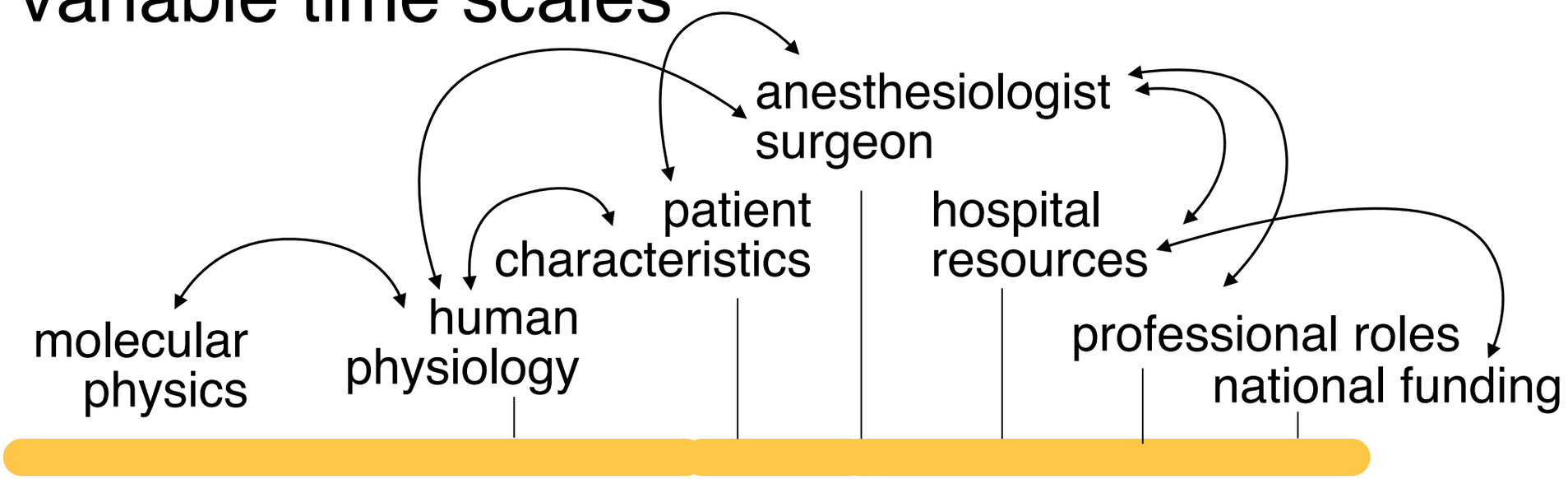
case: “soft” emergency

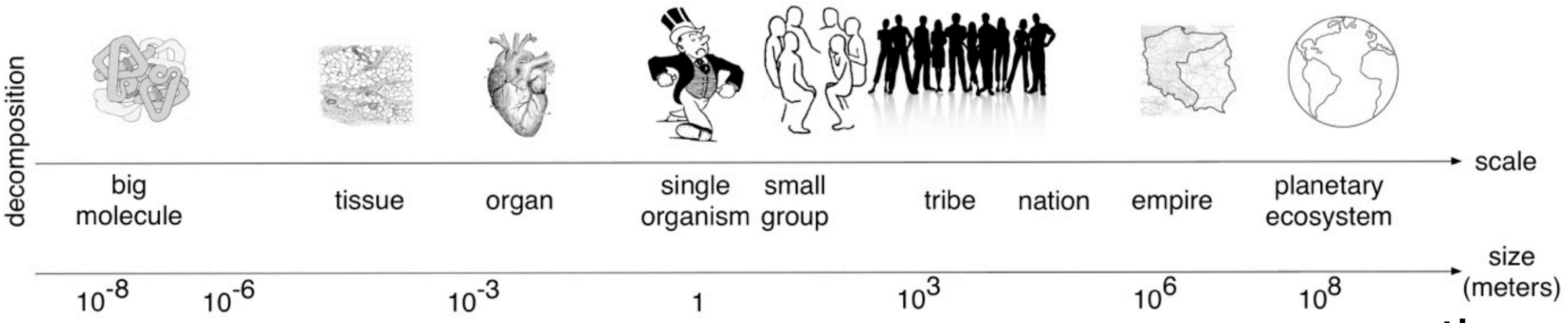
Cook & Nemeth, Taking things in one’s stride”,
Hollnagel et al., *RE: Concepts and Precepts*

- resilience is a property of *the system*
- resilience arises from system *ecology*



- **R** is multiply contingent
- variable time scales





- Resilience *manifests* at one scale
- Resilience *involves* all the scales

Signs of resilience in action:

1. Recognizing altered situations
2. Anticipating possible trajectories
3. Assessing consequences, probabilities, significances
4. Creating and deploying buffers and reserves
5. Hedging against high-loss outcomes
6. Mobilizing & directing resources
7. Sacrificing lower level goals
8. Switching tactics in escalating settings
9. Balancing recovery and rescue
10. Restoring capacity

- Resilience is the story of the accident that didn't happen.
- Resilience is the second story.
- Resilience may be *visible* at a particular scale but the sources of resilience are *active at all scales*.
- Are healthcare settings and organizations conducive to resilience?
- Can healthcare settings and organizations be engineered to enhance resilience?
- How would a resilient healthcare system react to the sudden absence of staff? [Swedish summer]