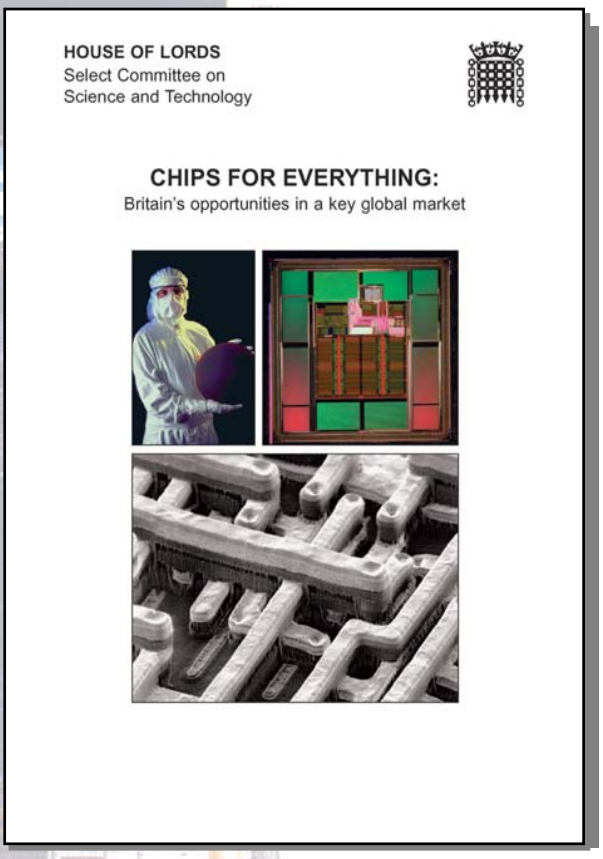
# Chips for Everything:
## Britain's opportunities in a key global market

Steve Furber
The University of Manchester
sfurber@cs.man.ac.uk



# Outline

- The House of Lord's inquiry
- Principal recommendations
- What should we do?
- Conclusions

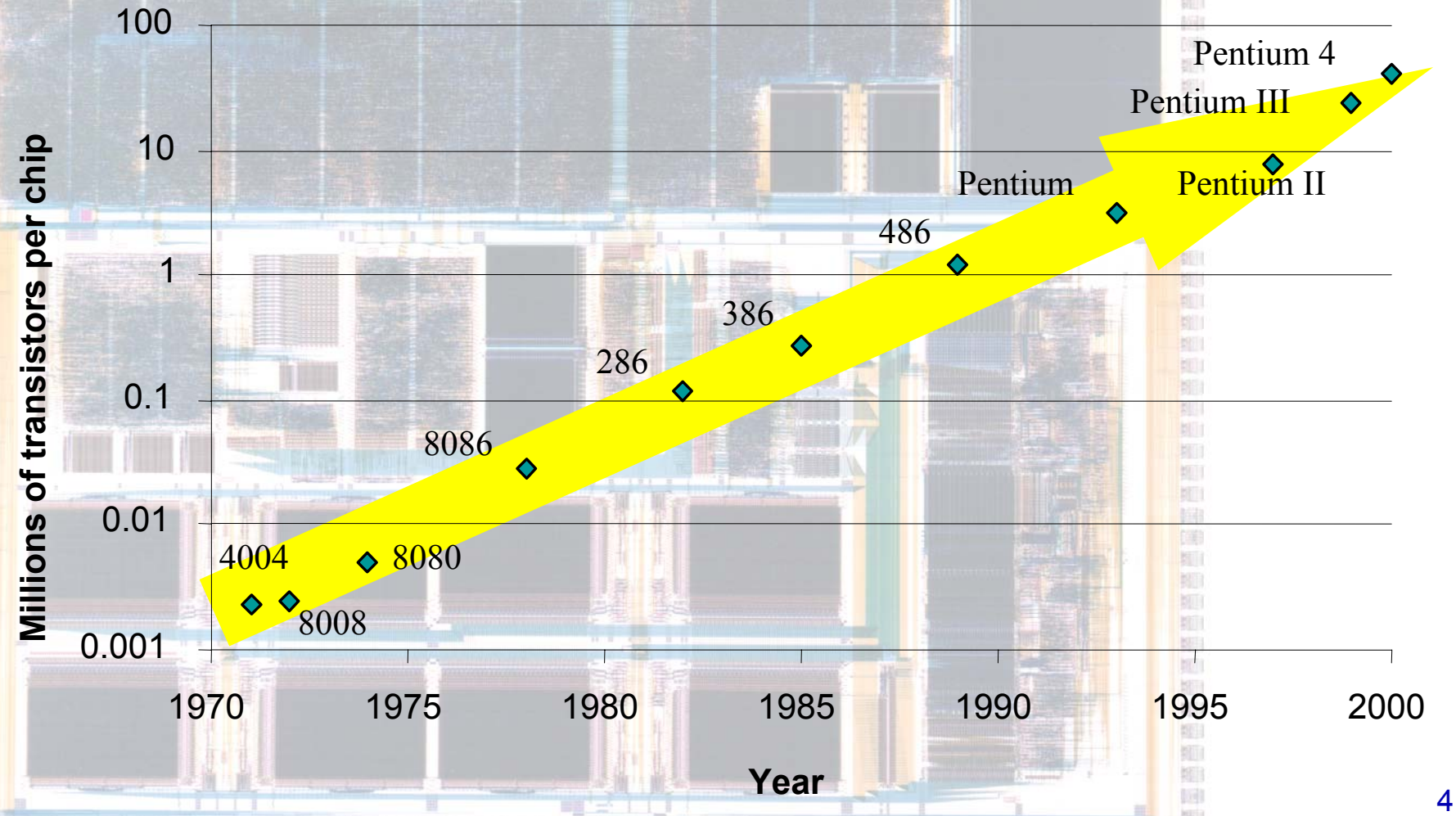
# Origins of the Inquiry

THE UNIVERSITY of MANCHESTER

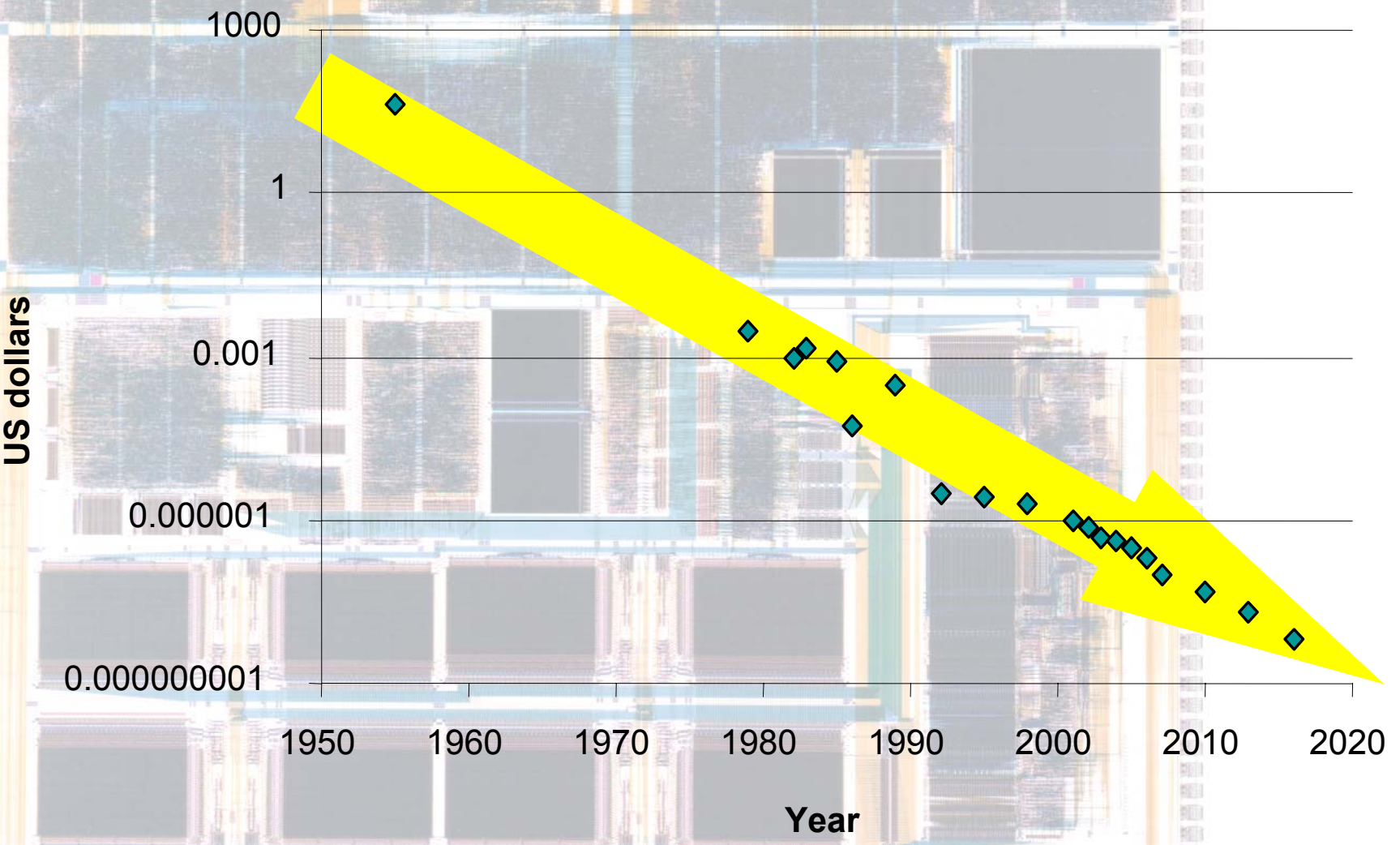
- Meeting of the HoL S&T Select Committee with the Royal Society
- "End of Moore's Law"
  - only 10 years or so to run?
- UK strengths in new device technologies
  - quantum computing, spintronics, …
- greater co-ordination needed to maximise benefit
- Inquiry: "Innovations in Microprocessing"

# Moore's Law

*Transistors per Intel chip*



# Cost of a Transistor



# The outcome of the Inquiry

THE UNIVERSITY of MANCHESTER

- The UK no longer has a major interest in semiconductor manufacture
  - though there is considerable inward investment
- However, the UK has major strengths in microelectronic design
  - 40% of European independent semiconductor design market
  - much of this is in SMEs and start-ups
  - also strong academic design research
- Conclusion:
  - the major UK opportunities are in design!

# Outline

- The House of Lord's inquiry
- Principal recommendations
- What should we do?
- Conclusions

# Principal recommendations

THE UNIVERSITY of MANCHESTER

## Design and architecture:

- EPSRC funding review for research into microprocessor design and architecture
  - match level and delivery to UK industry needs
- A single UK research institute for SoC design
- A national programme for design and architecture
  - along the lines of e-Science

# Principal recommendations

THE UNIVERSITY of MANCHESTER

## Microprocessor technologies:

- research into devices and manufacturing should focus on radical developments
  - greater prospect of longer-term UK role

## Skills need:

- action needed to address recruitment crisis
  - encourage university-academia staff exchange

# Principal recommendations

THE UNIVERSITY of MANCHESTER

## Assisting new ventures:

- rationalise UK IP exploitation mechanisms
  - government, industry, universities
- "funding gap", managerial skills shortage, …

## Interdisciplinarity:

- is a good thing, should be fairly assessed, …

# Outline

- The House of Lord's inquiry
- Principal recommendations
- What should we do?
- Conclusions

# Government response

THE UNIVERSITY of MANCHESTER

**Lord Sainsbury** *(Hansard, 14 March 2003)*:

"…we have not yet finalised our response but…"

"The Government support many of the findings and recommendations…"

"…in recent years microprocessor design and architecture has become less well represented in EPSRC's overall portfolio. Steps are being taken to address that…"

"…ISLI has been a great success and has much expertise relevant to the recommendations"

# What should we do?

- A national centre?
  - ISLI already exists
  - re-inforce ISLI position
    - emphasize UK as well as Scottish role
- A national programme
  - along the lines of e-Science
  - virtual national centre
  - could be a Grid customer?

# What should we do?

- Get our act together
  - form a coherent community
  - agree long-term research theme(s)
  - increase awareness of UK design strenths
- Themes:
  - bio sensor nets?
  - large-scale on-chip multiprocessing?
  - …
- Balance outputs
  - research, PhDs, spin-outs, …

# Outline

- The House of Lord's inquiry
- Principal recommendations
- What should we do?
- Conclusions

# Conclusions

- The HoL report has been widely accepted
- There is a major opportunity for the UK in microelectronic design and architecture
- There may be significant new funding if we can get our act together
  - agree national research "theme(s)"
  - get industry and academia communicating
  - sing from the same hymn sheet