Embedded Computation

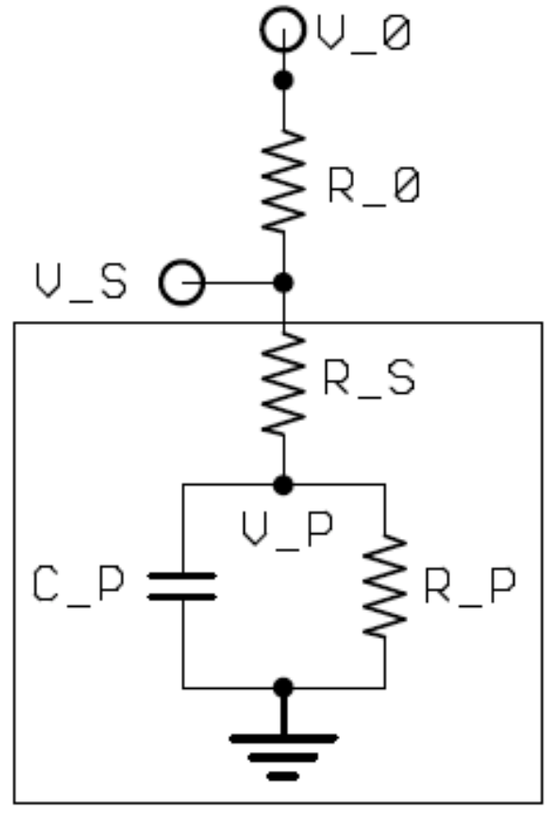
Digital Fabrication meeting
Aug 2005 - Tromso

Manu Prakash

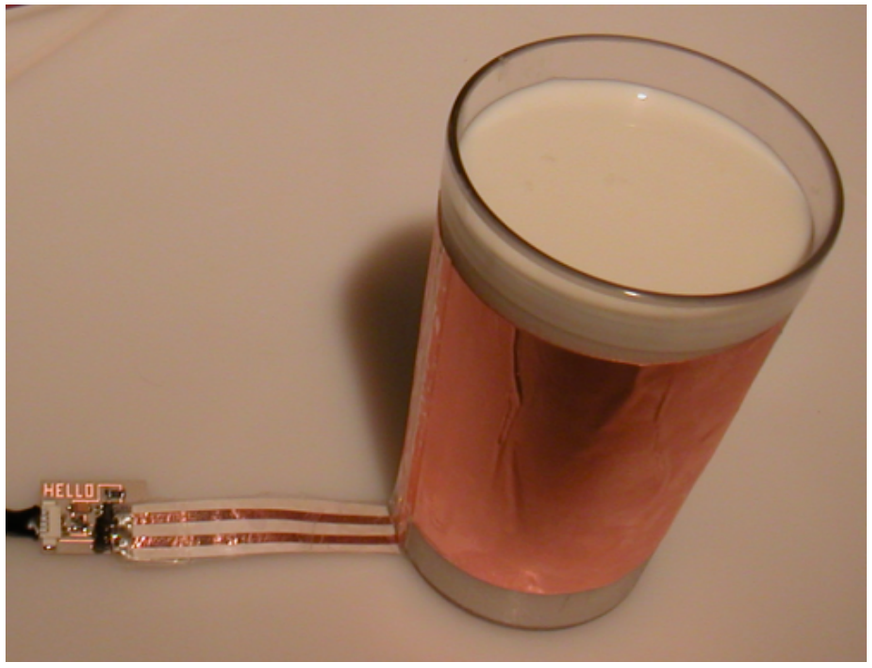
Overview

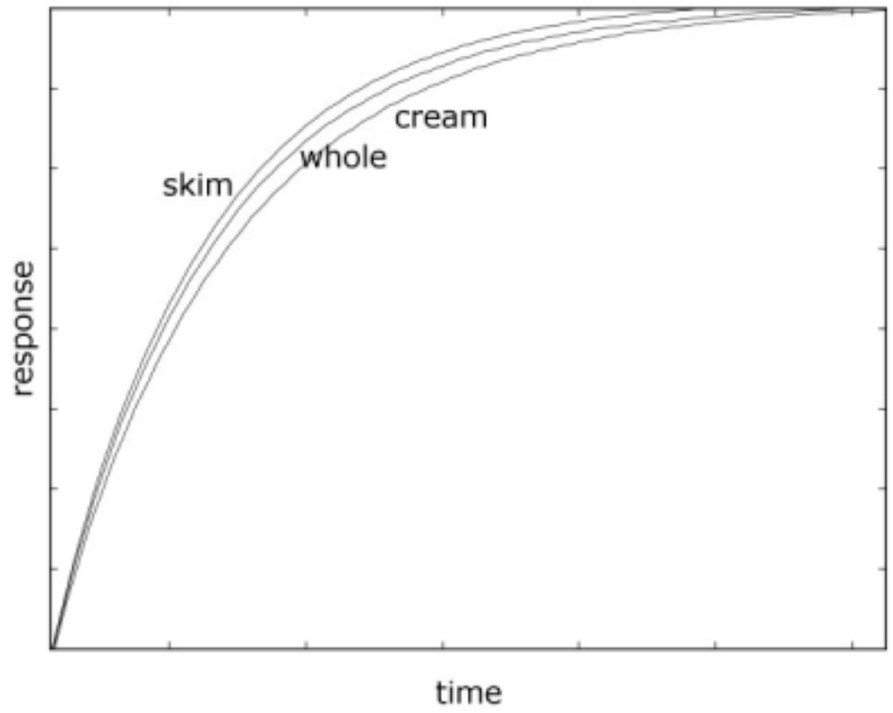
- Impulse response
  - Milk analysis
- Field producable logic

Electronic instrumentation



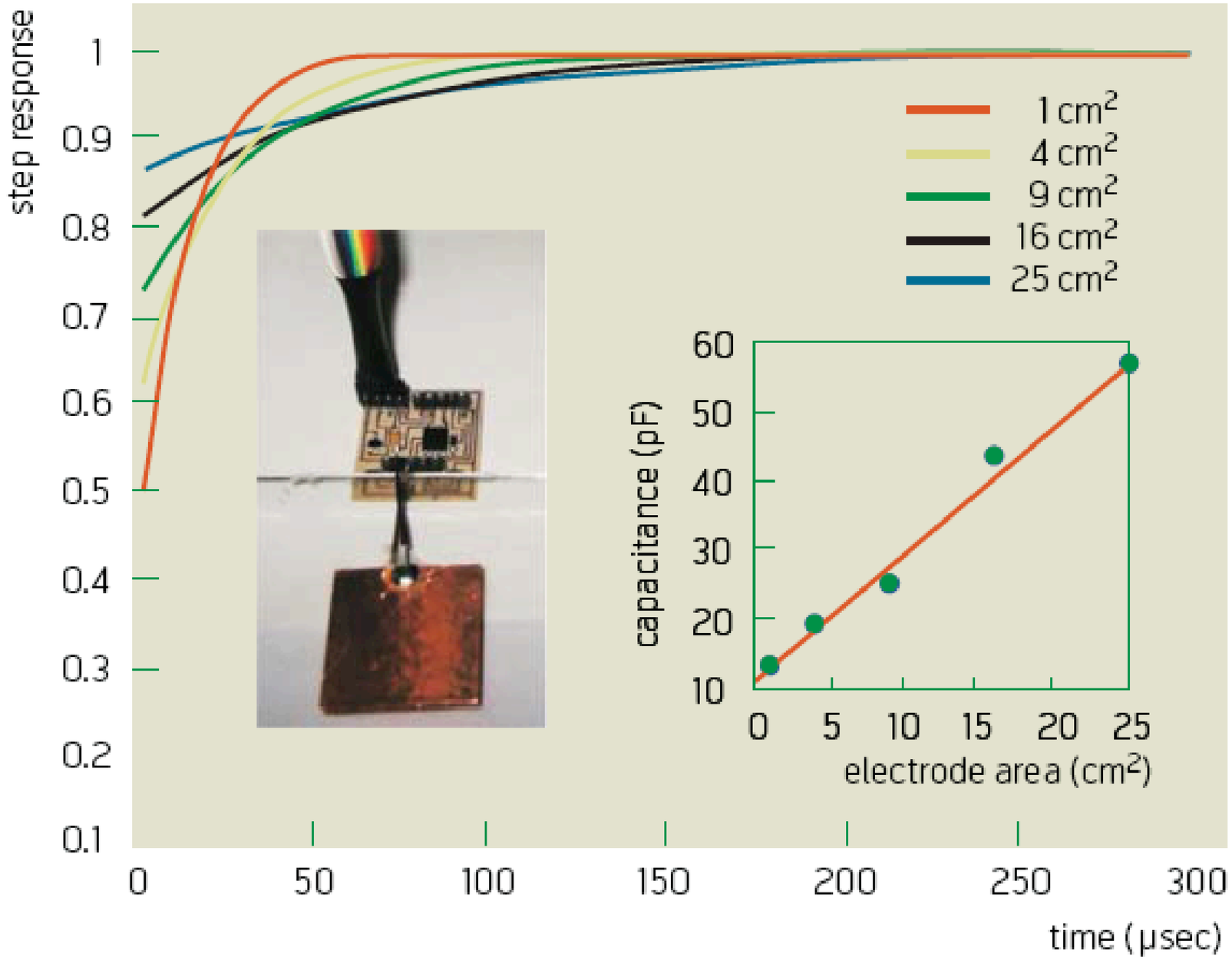
Impulse response for milk





Fab : The coming revolution on your desktop; Neil Gershenfeld April 2005

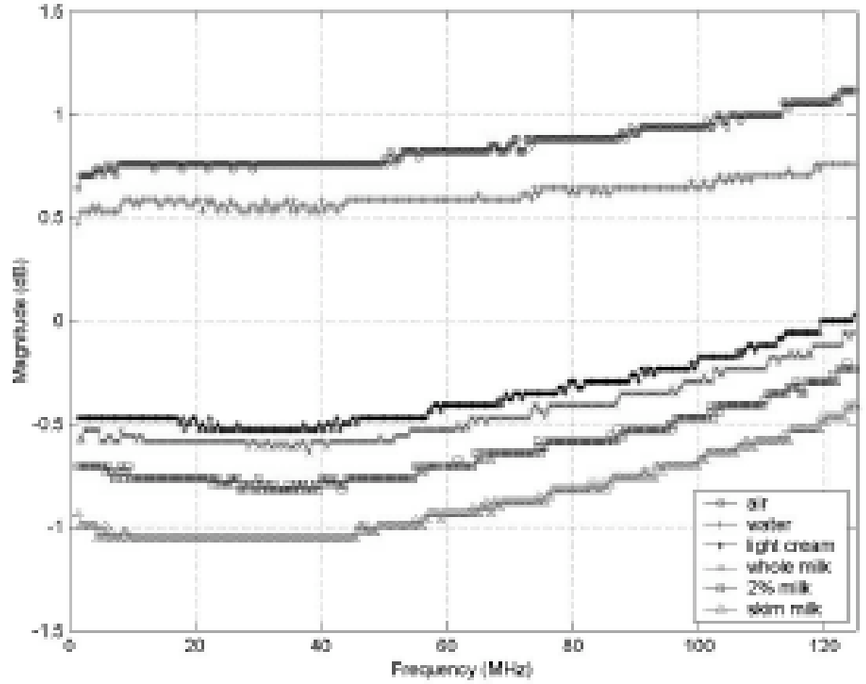
Step response charging curves

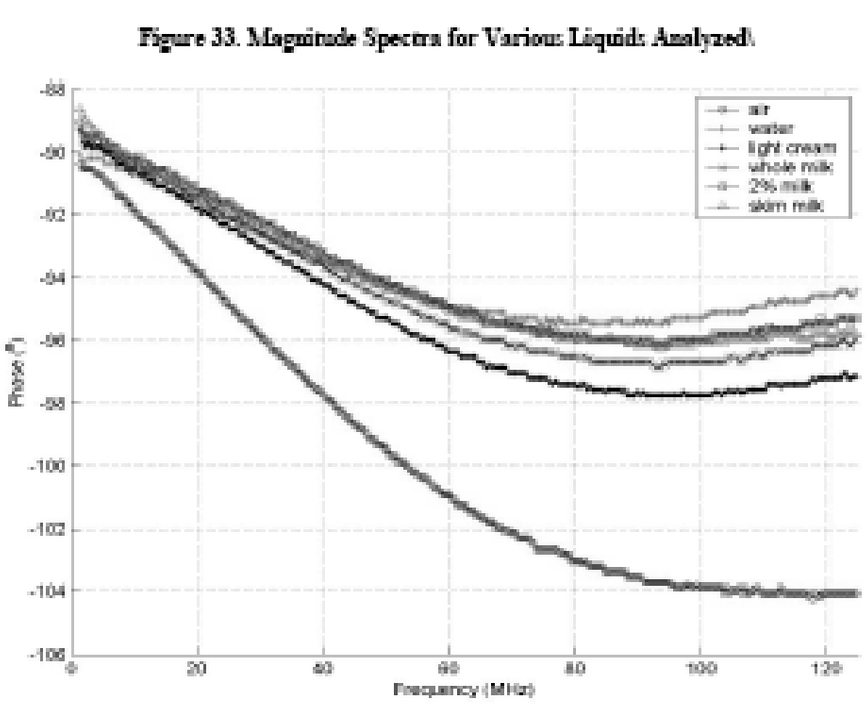


Dielectric constant measurements of glass substrate via impulse response

Phase and magnitude spectra for common liquids vs frequency

motor oil
water
light cream
skim milk
2% milk





Esa Massood : Low cost network analyzer for electronic sensing applications.
MS Thesis MIT

Fabricating computation

John Bardeen and Walter Brattain, Bell Labs 1947

Form is function ?

Why build computation in a Fablab?

Producing logic, sensing and actuation in a single process

Field producable logic family

Towards logic at low-reynolds numbers

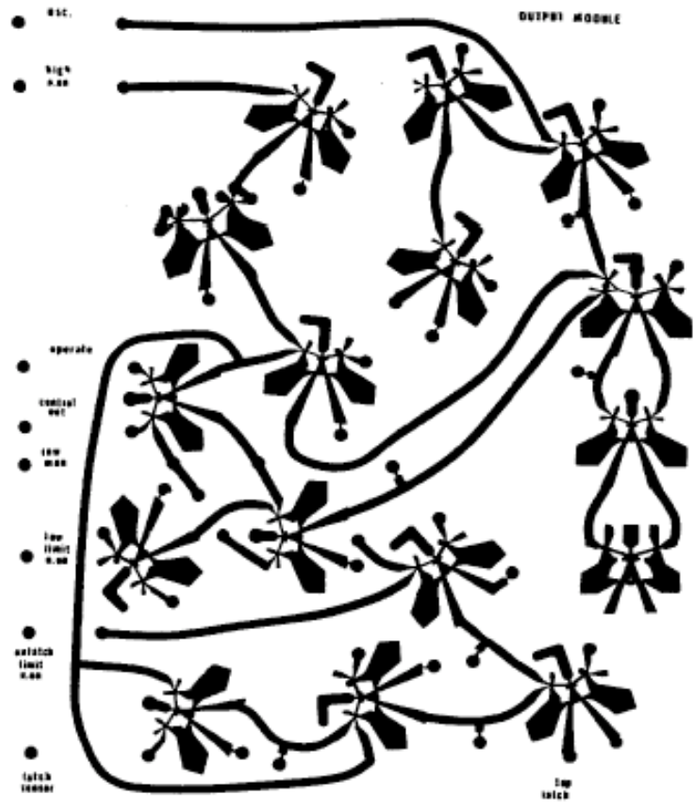
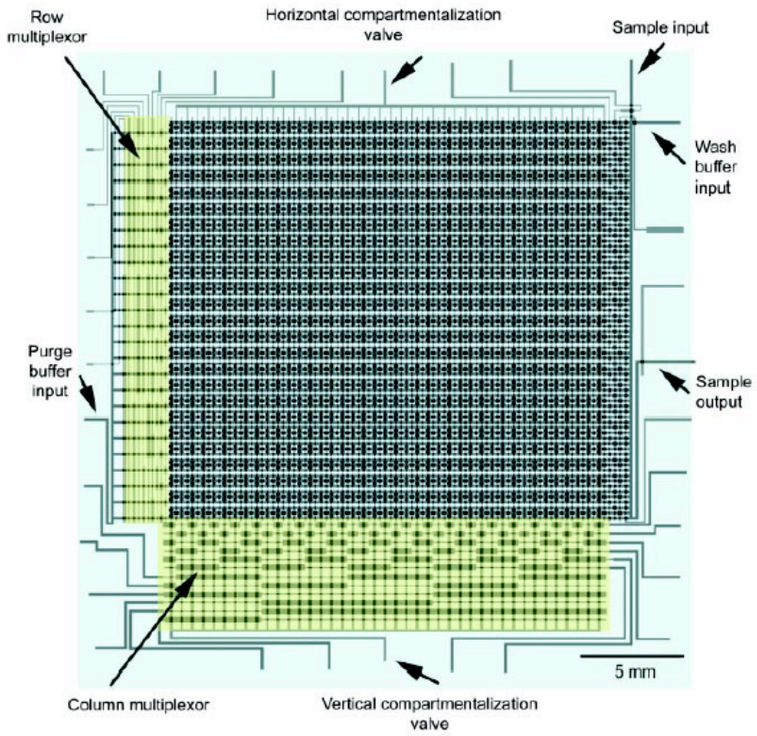


Figure 6. Integrated Circuit of Sandia Elements

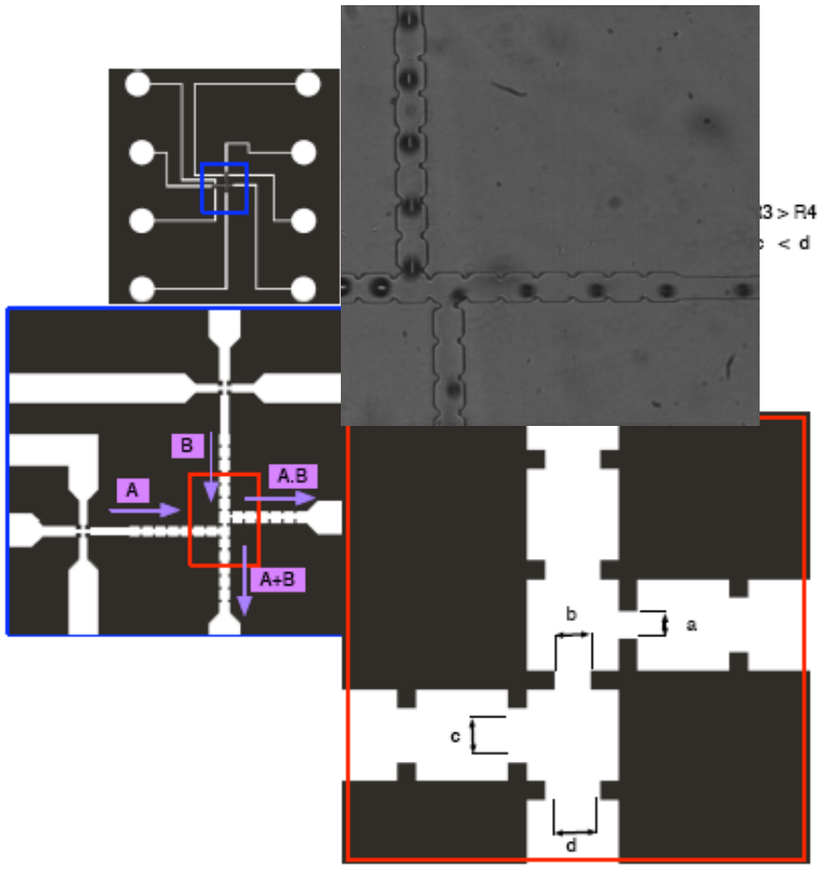


Two phase microfluidic bubble logic

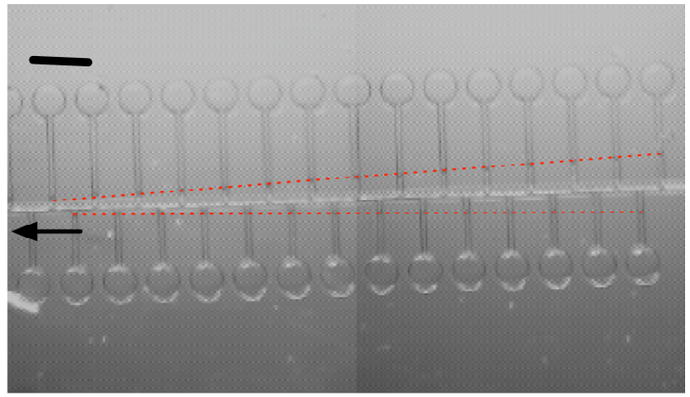
Digital Revolutions
communication - computation - chemistry

Bubble Logic parts

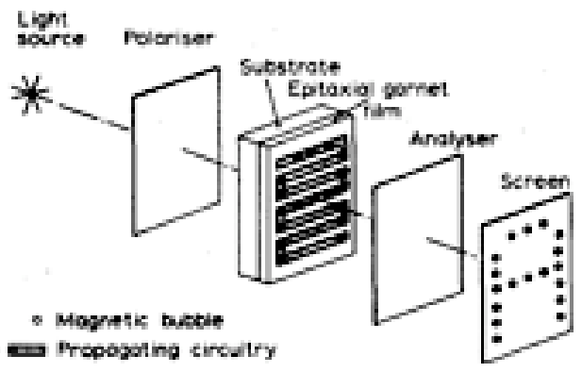
Logic gate



Actuators/Sensors



Bubble Displays



Bistable memory