

# QCA and SET's

BEWARE OF ONGOING ROAD CONSTRUCTION

RET 2009

John Taylor working with Robin Joyce

# Building better computers

» Size,

» Heat, and

» Interfacing

Solutions: next exit



# A progression: vacuum tubes

» Size:

» Heat:

» Interfacing:

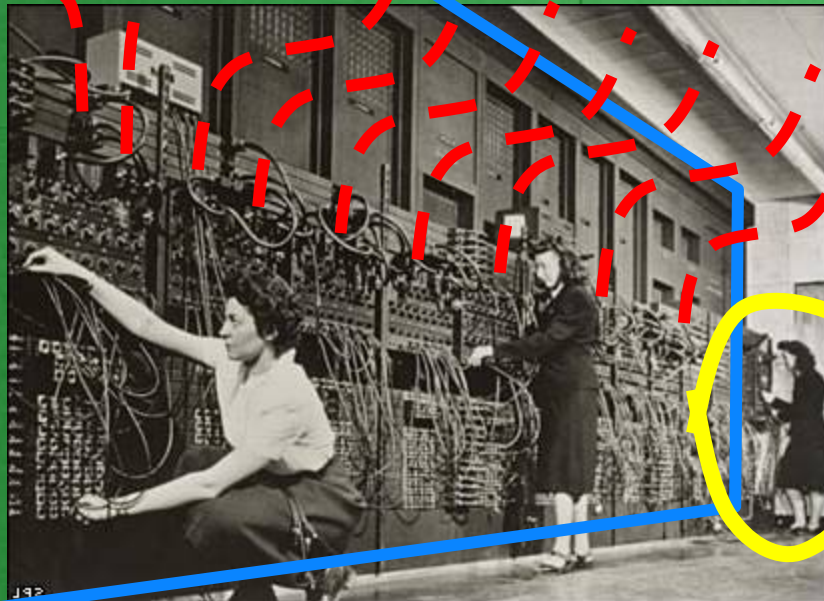
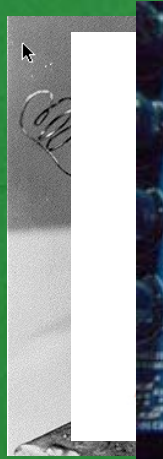


Image: US Army photo



# A progression: transistor

» Size:



» Heat:

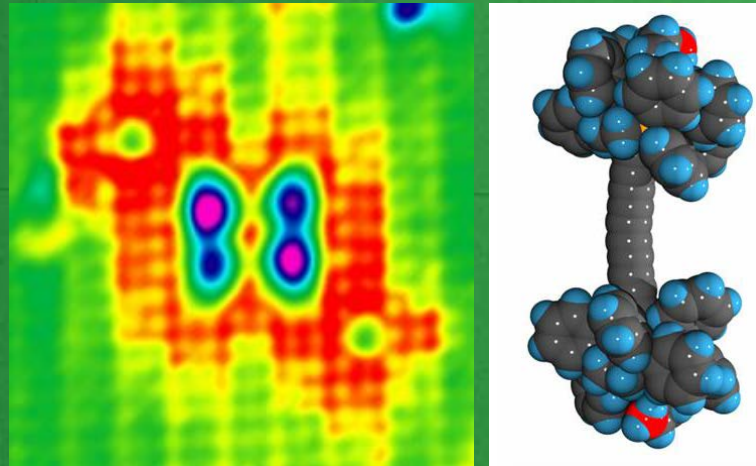
» Interfacing:



Images: Bell labs, (RCA) United press, (HP) Dave Mody, Kodawarisan, Apple

# A progression: Quantum - Cellular - Quantum

» Size:



» Heat:

» Interfacing: ■ ■ ■ ■ ■ ■ ■ ■

?



Interfacing QCA devices

Single Electron Transistor  
immediately ahead

SET

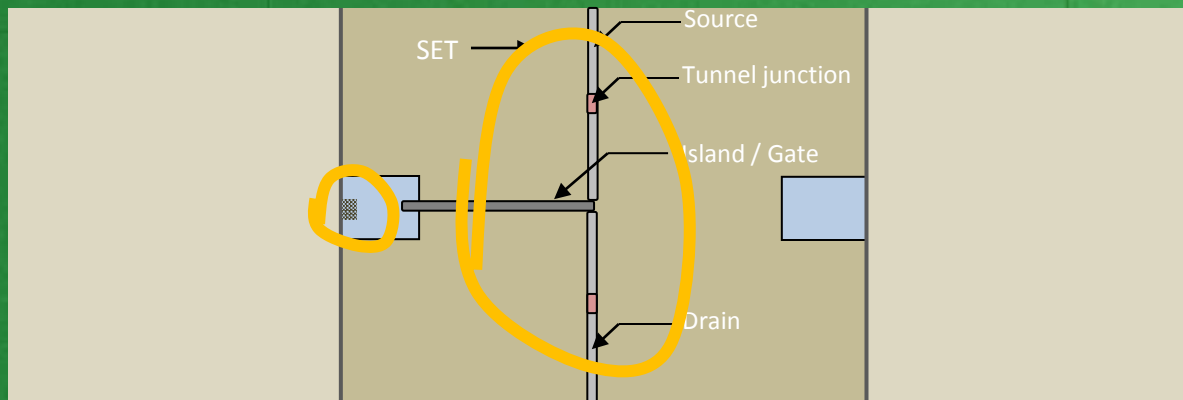


# SET

- » A very, very small transistor
- » Sensitivity
- » Lithographic process
- » Couples to QCA?

# Fabrication with Robin Joyce

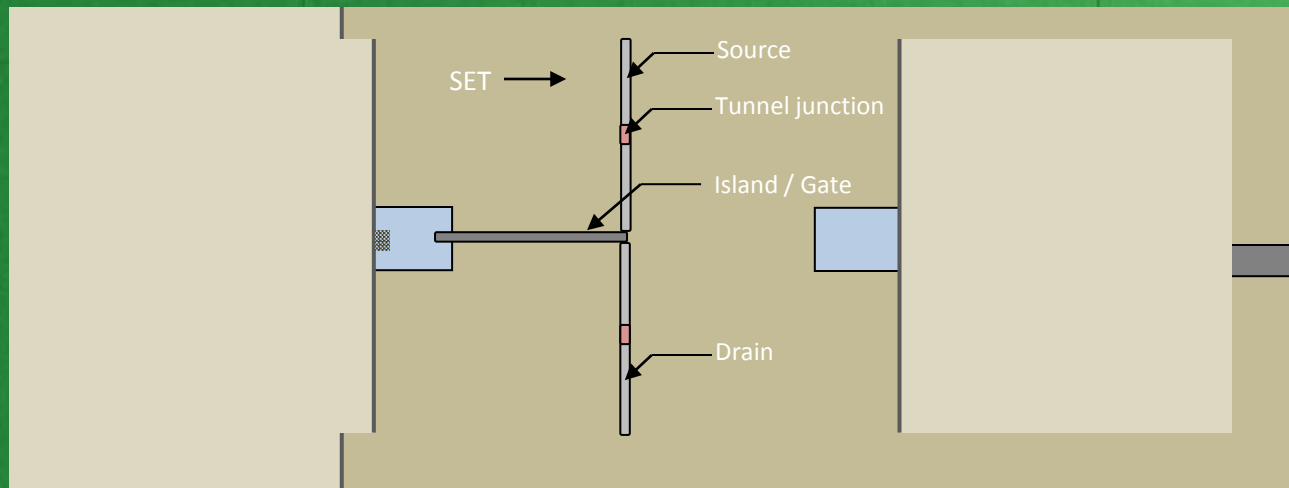
## Top section





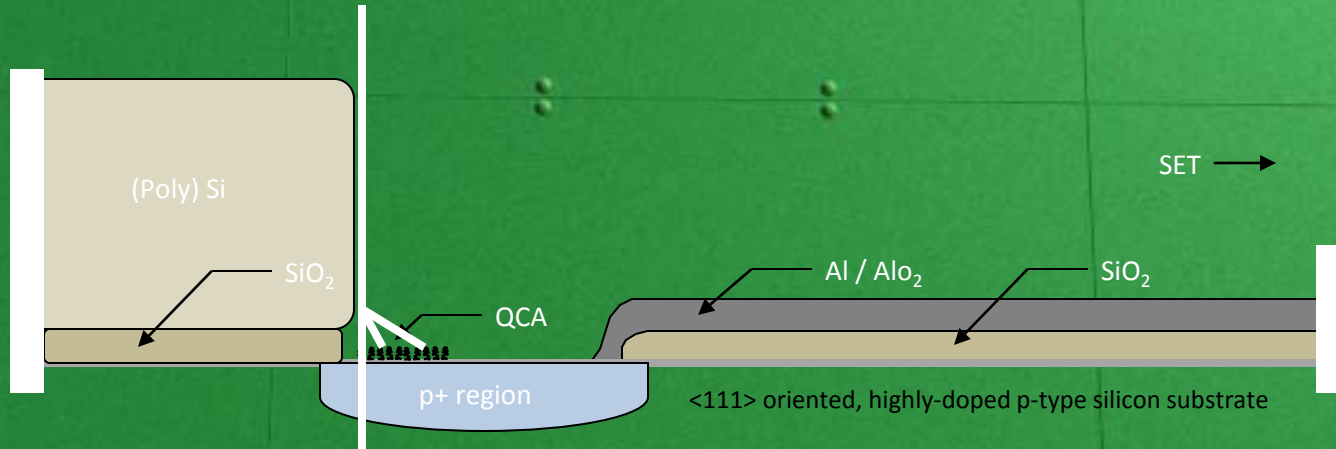
# Fabrication with Robin

Top section - zoom



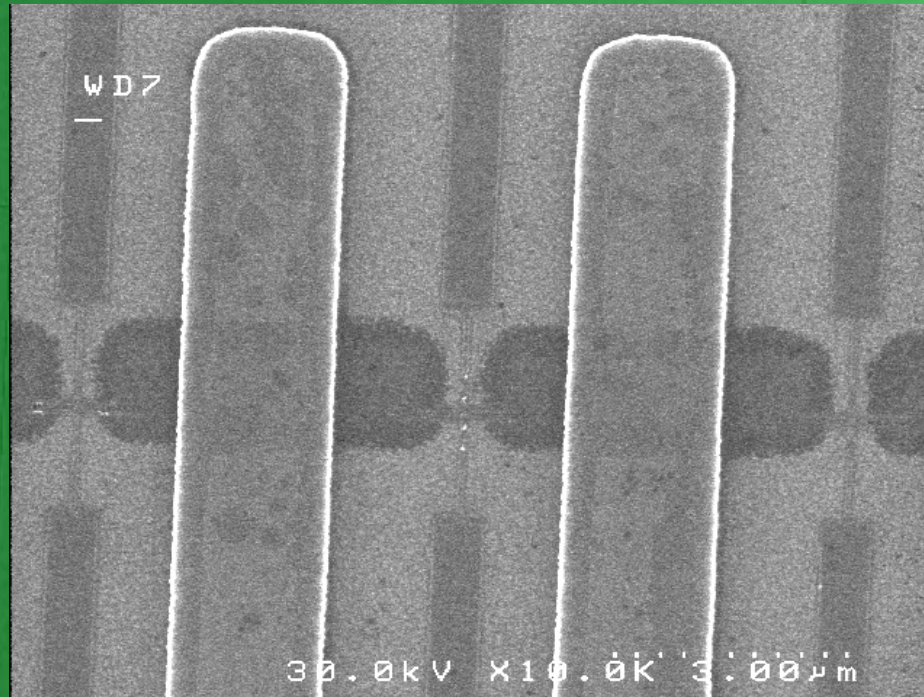
# Fabrication with Robin

Side view



# Fabrication with Robin

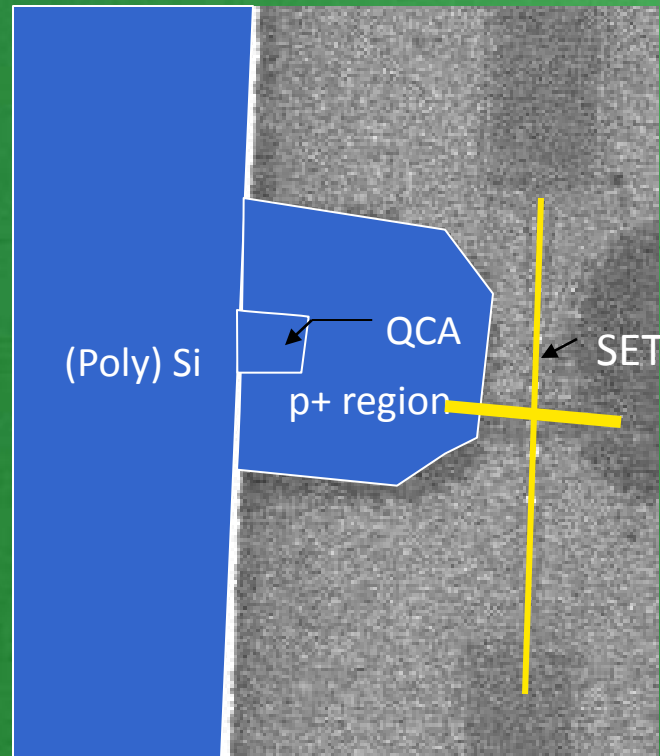
Device:





# Fabrication with Robin

Device:



# For my students

- » Electronic basics 0 miles
- » Improved instruction 0 miles
- » Lithography next exit
- » QCA and SET next exit
- » Fab lab visit this Fall
- » ND EE visit next Spring

# For my students

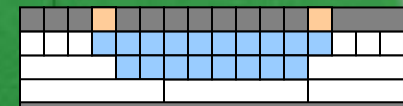
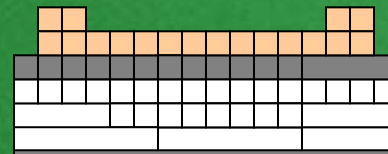
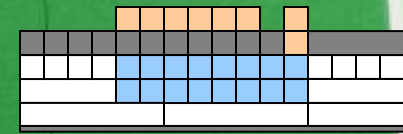
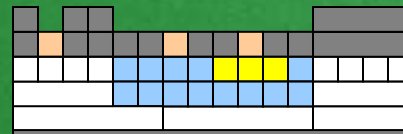
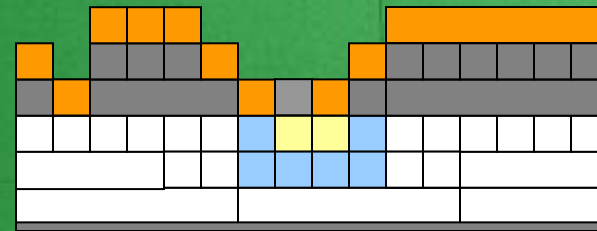
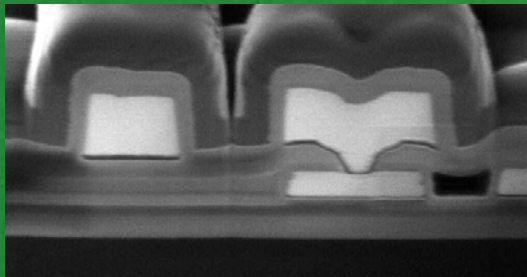
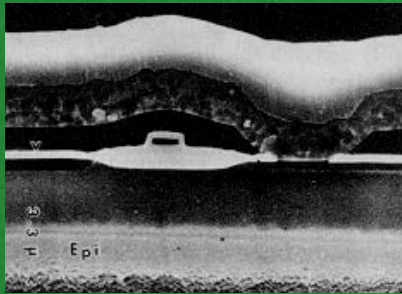
» An introduction to fabrication using  
Lego's.



» Lego is a trademark of the LEGO Group.



# For my students



<http://www.chm.bris.ac.uk/~paulmay/misc/msc/msc1.htm>

» <http://www.uni-magdeburg.de/iwf/labore/wt/13/l13fib-eng.html>

# For my students

A chance to go into the world of the  
researchers...

QuickTime™ and a  
TIFF (Uncompressed) decompressor  
are needed to see this picture.

# For my students

QuickTime™ and a  
TIFF (Uncompressed) decompressor  
are needed to see this picture.

...A chance to bring the researchers  
into their world.



# For more information



» RET website



» <http://staff.elkhart.k12.in.us/jtaylor/mainpageIX.html>



» [jtaylor@elkhart.k12.in.us](mailto:jtaylor@elkhart.k12.in.us)

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