

Side paths along the ITRS-Road

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The ITRS Road

What hides beyond the blue mountains?

- Quantum computing?
- Iwai's mosquito?

5 nm 2030?

Side road:

- CNT
- NW
- Nanoribbons (Graphene)
- III-V and Ge channels
- SET
- Molecular
- Ferromagnetic
- Spintronic

8 nm

12 nm

16 nm

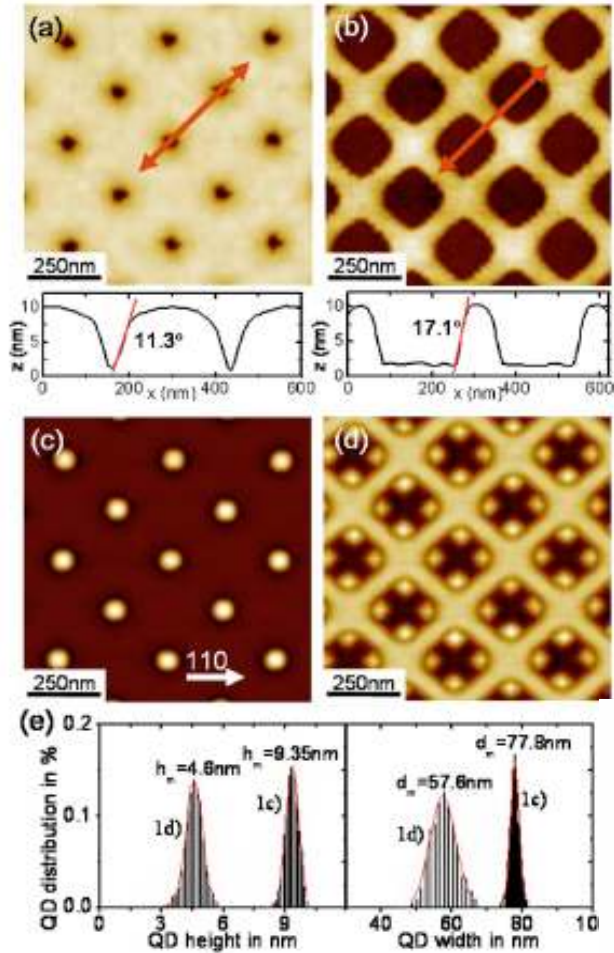
22 nm

32 nm

ITRS 2008 update:
No paving! Lower speed!

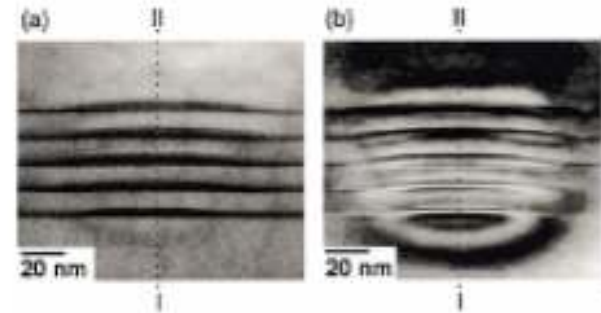


Templated self-assembled QDs



Dais et al, APL **92**, 143102 (2008)

Quantum computation
Spintronics
(Dot-FETs)

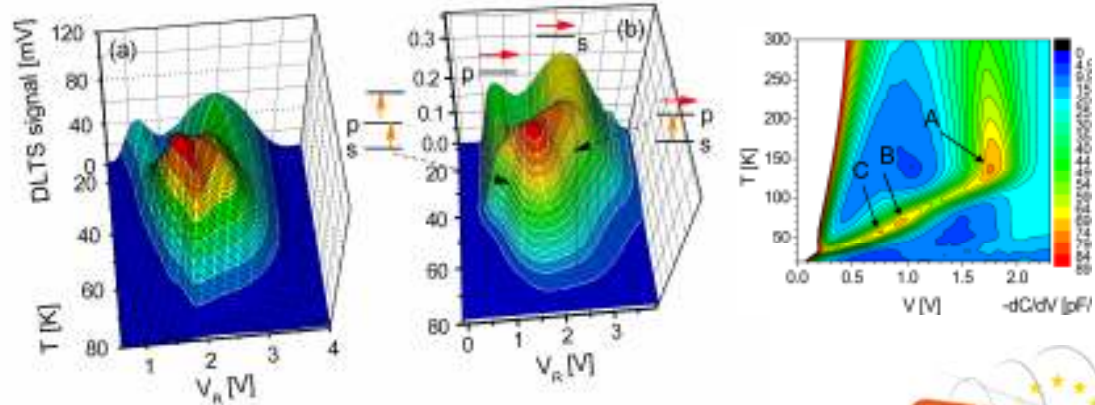


Schmidt & Eberl, IEEE TED, **48**, 1175 (2001)

Characterization

DLTS

$-dC/dV$

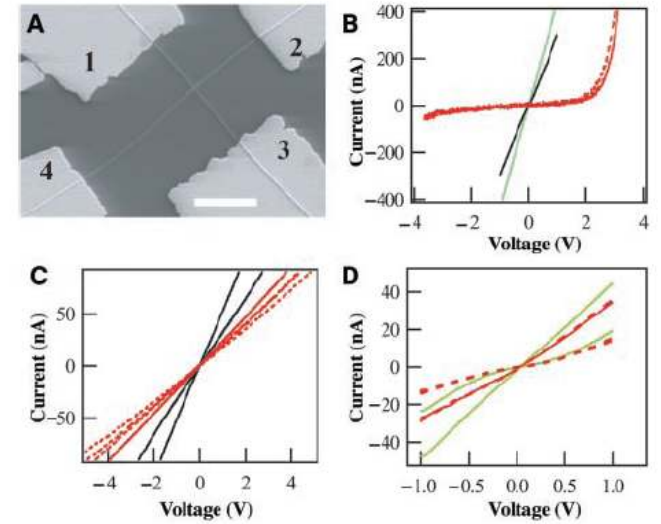
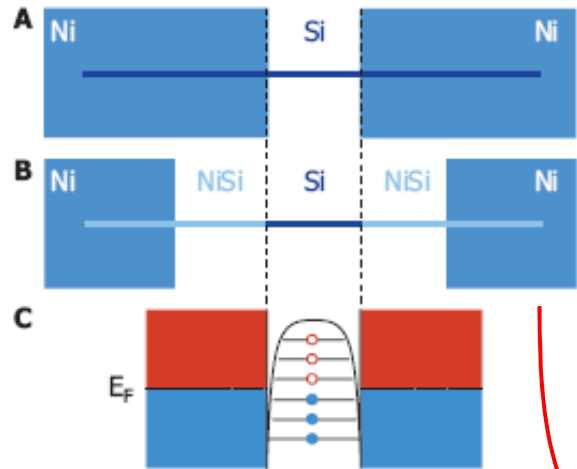


APL, **91**, 033110 (2007), APL **95**, 013104 (2009)



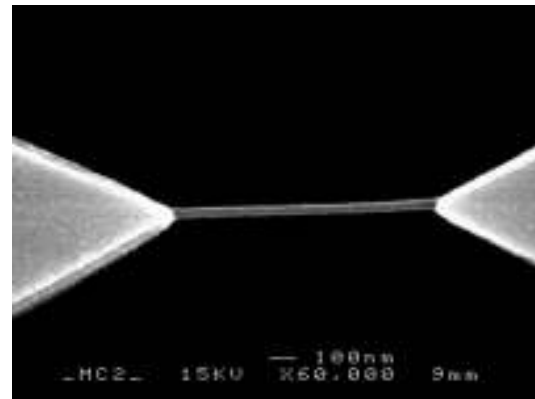
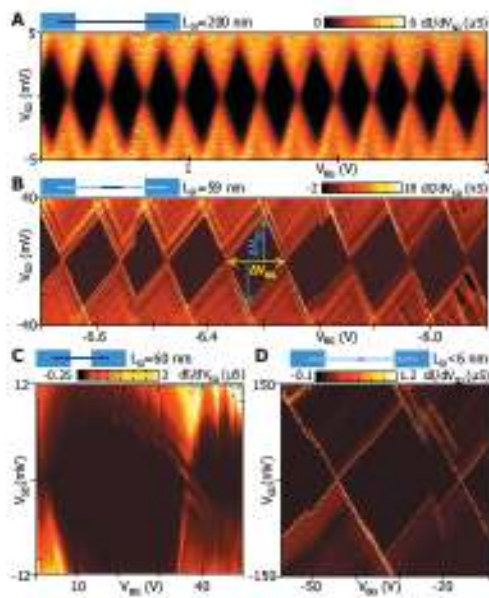
Silicon nanowires

For the 5nm node?



Cui & Lieber Science 291, 851 (2001)

Could perhaps be easier done by a top-down approach

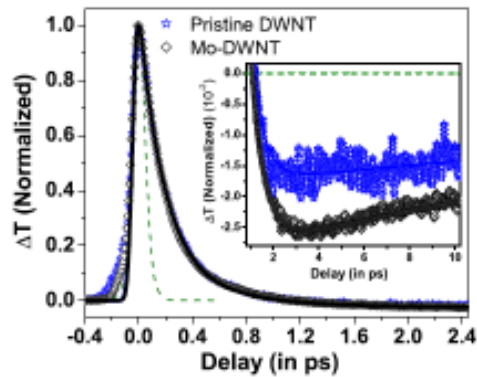


Zwanenburg et al, JAP, **105**, 124314 (2009)



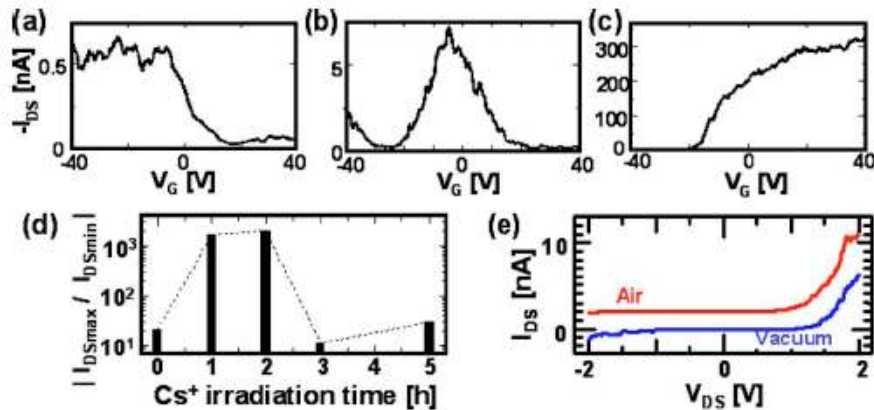
Carbon nanotubes

Optical switch



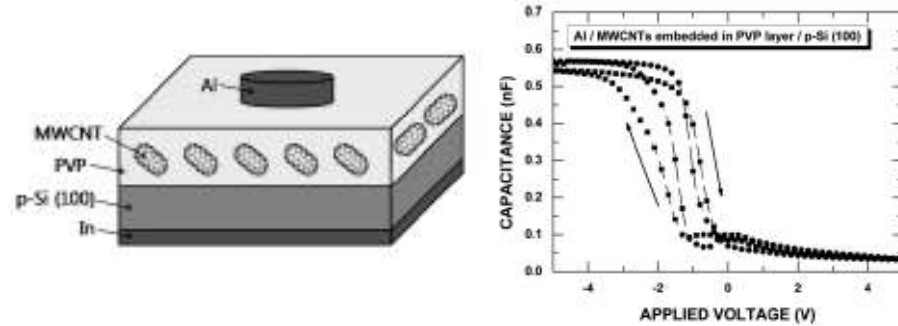
Kamarai et al APL **95**, 081106 (2009)

pn-junctions



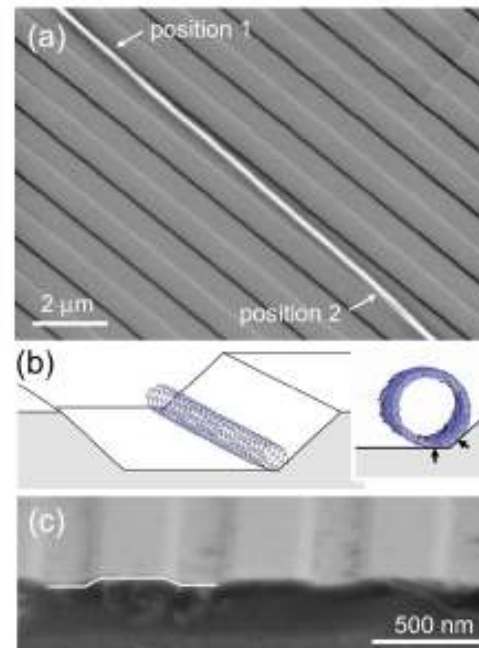
Kato et al, APL, **95**, 083109 (2009)

Non-volatile memory function



Kim et al, APL **95**, 022104 (2009)

Aligning CNTs

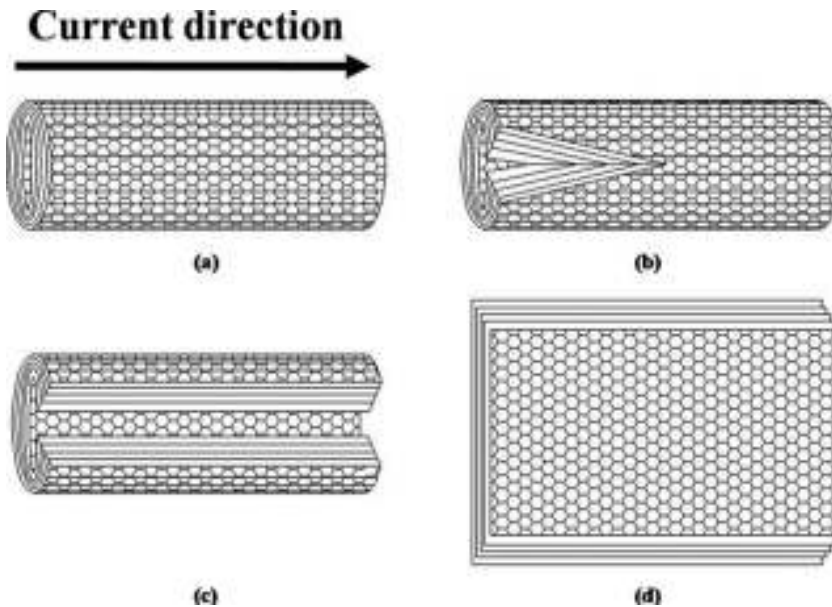


Orofeo et al APL **94**, 053113 (2009)



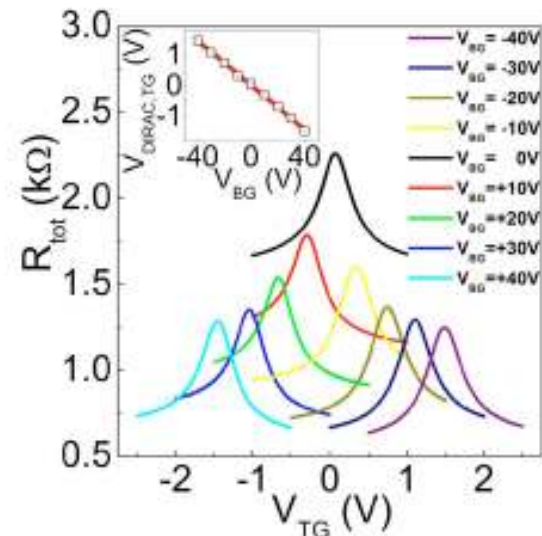
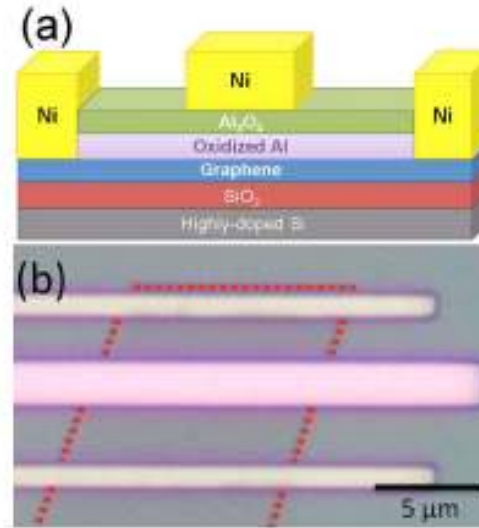
Graphene

Making graphene from CNTs



Woo Sik Kim et al, APL 95, 0831013 (2009)
(Seoul)

Transistors

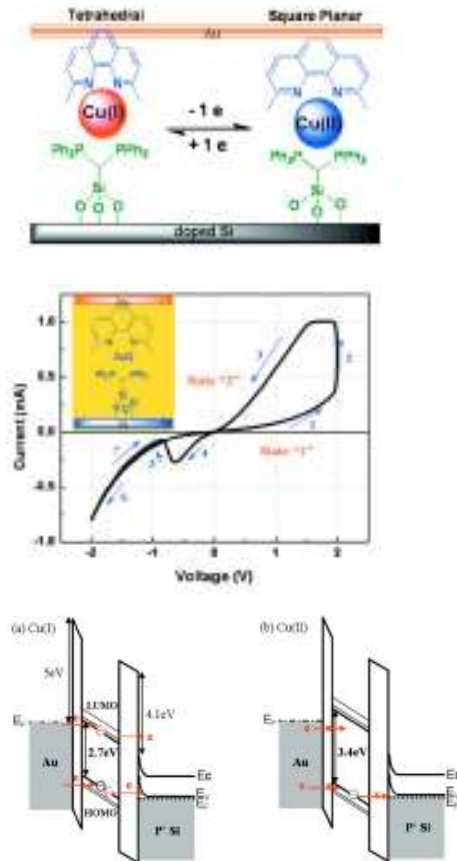


Seyoung Kim et al, APL 95, 0831013 (2009) (Univ. Austin)



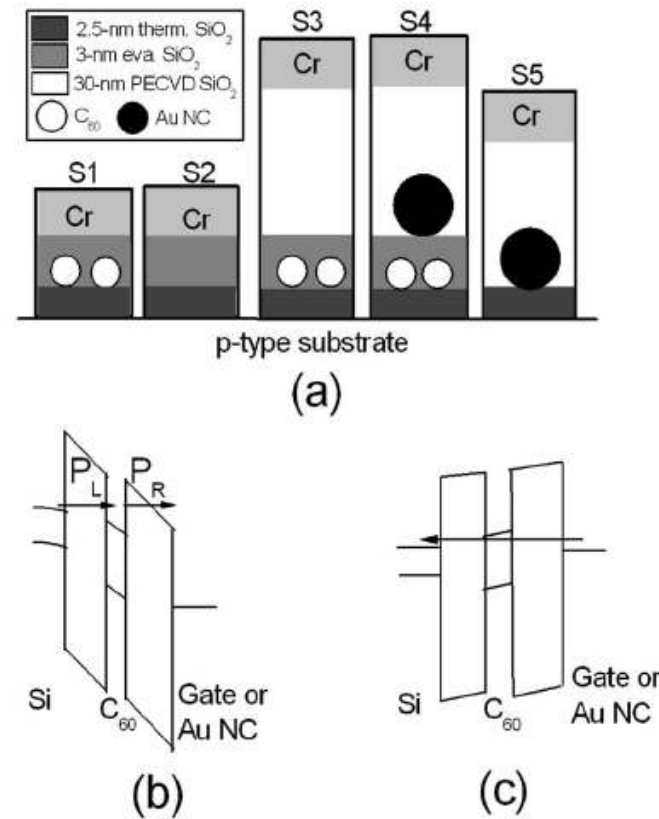
Molecular electronics

Molecular rotor device



Xue et al APL **95**, 093503 (2009)

C₆₀ for non-volatile memory



Hou et al, APL **92**, 93159 (2008)

