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Semiconductor technology: Go Big

- Wafer Scale Integration

Technology	Area	Area/device	Number
VLSI	1 sq cm	25 sq μ m	4 \times 10 ⁶
WSI	100 sq cm	10 sq μ m	1 \times 10 ⁹

Semiconductor technology: Go Small

- Nano-Electronic devices
- Nano-Electronic Micro-Structures

Parameter	Value
Minimum dimension	1–10 nm
Typical device area	100–10 000 sq nm
Number per sq mm	10 ⁸ –10 ¹⁰
Number per system	10 ⁹ –10 ¹¹
PEs per system (SIMD)	10 ⁶
PEs per system (MIMD)	10 ⁴

Optical Computing

- The guiding **light** to future computing

Bio-electronic Computing

- Cyborg
 - neuron and silicon connections
- Chemical-computing
 - involves the generation of highly parallel ordered structures from solution
- DNA Computing
 - mutation

Quantum Computing

- Probably

Final Remarks

- “Parallel Computing has historically been a field
 - whose future promise has been characterized by hyperbole, but
 - whose development has been defined by pragmatism.”
- “It is worth noting that even the advent of nanotechnology is unlikely
 - to raise the number of computing elements in a single system
 - to anywhere near the number of neurons in the human brain.”