Fault Tolerant NanoBoxes
for Designing Computers Using Molecular Nanotechnology

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Laboratory for *A*dvanced *R*esearch in *C*omputing
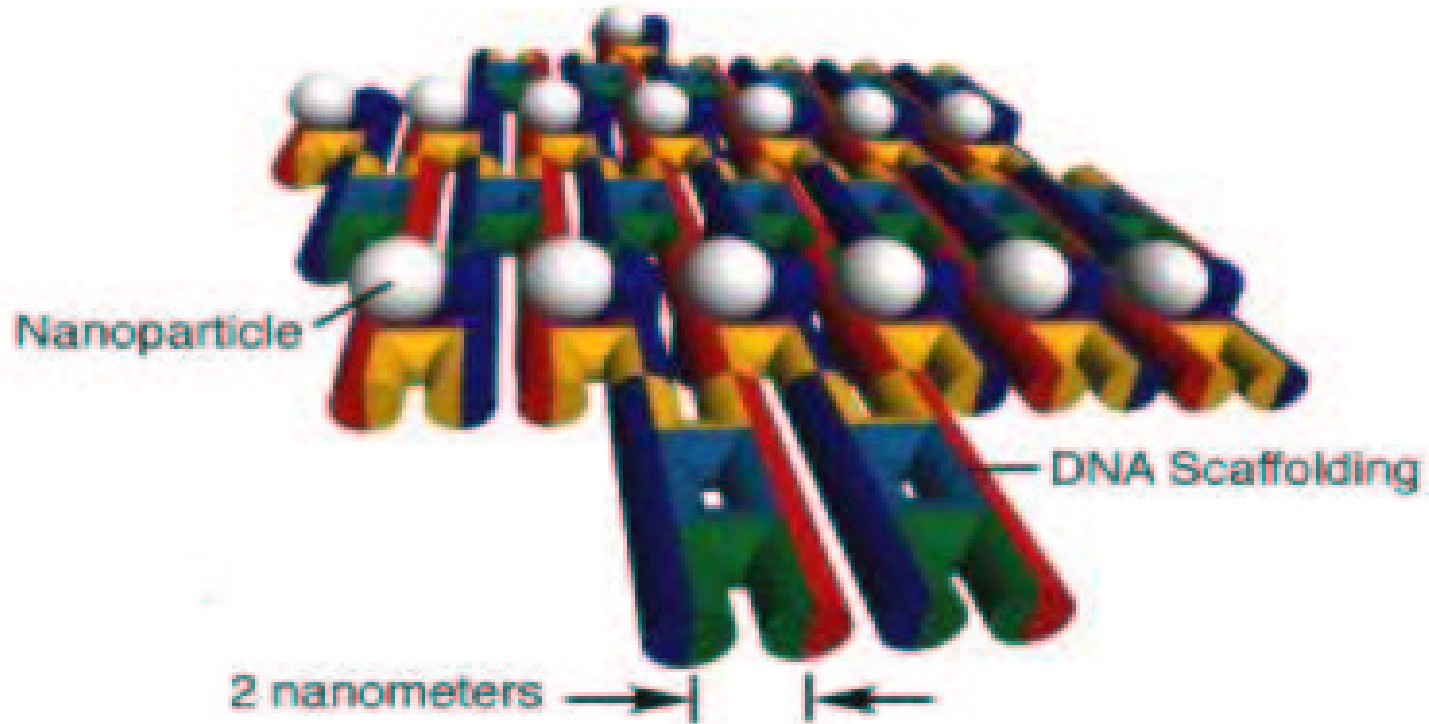*T*echnology and *C*ompilers

University of Minnesota
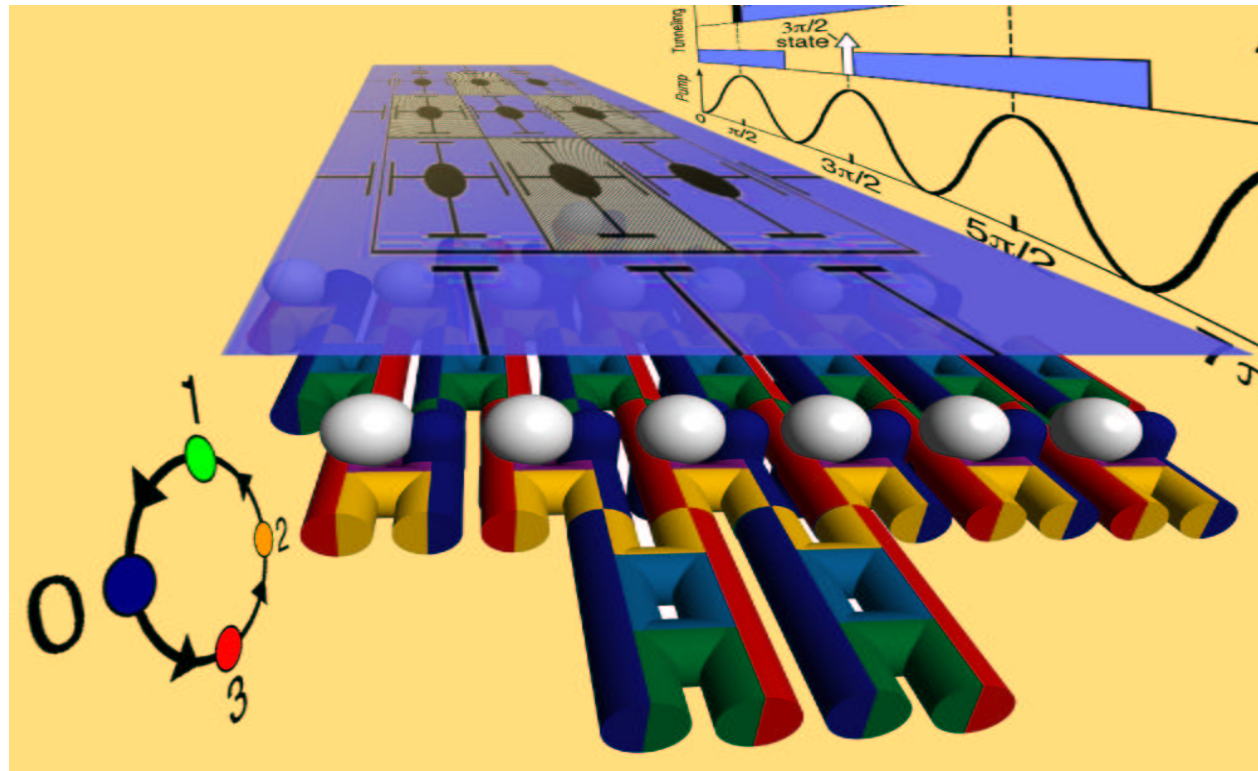
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DNA Scaffold

Proposed DNA Scaffold

DNA Scaffold with Circuit Map
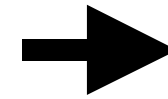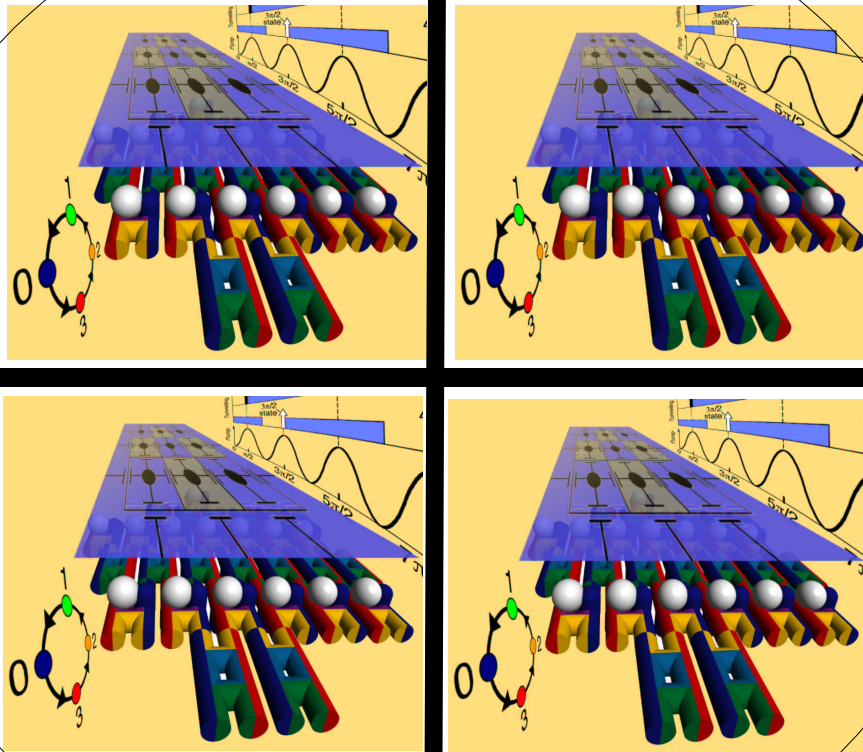

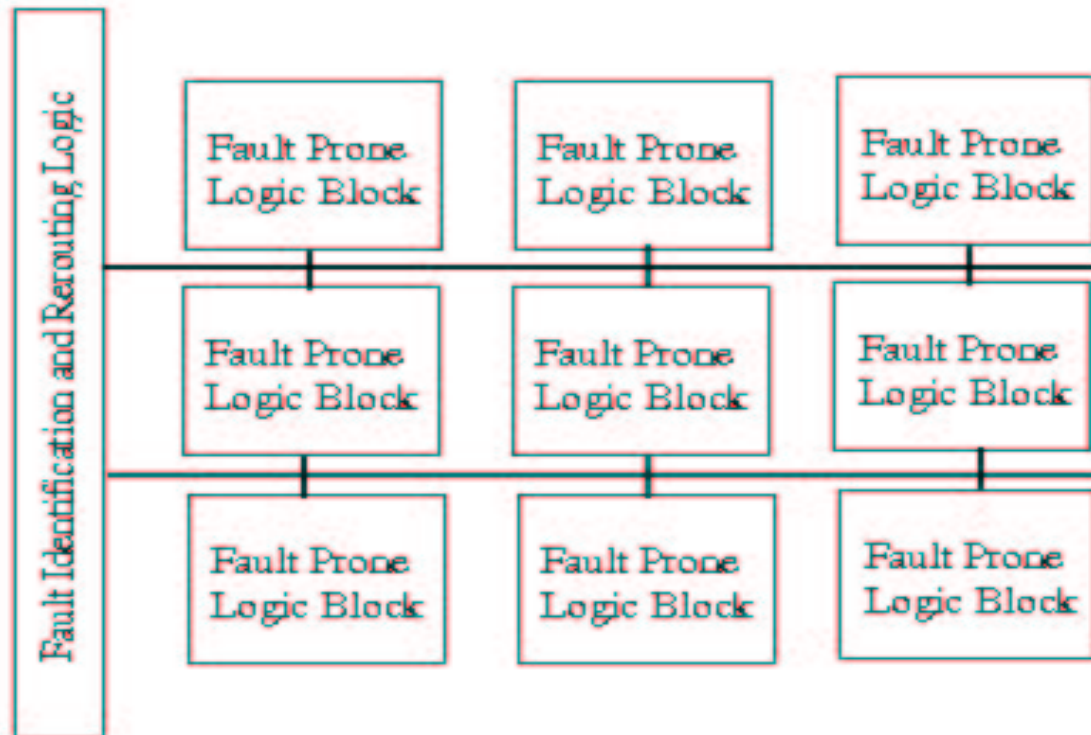Proposed DNA Scaffold with Circuit Mapping

Logic Blocks From DNA Scaffold

Becomes...

FT Nano Architectures
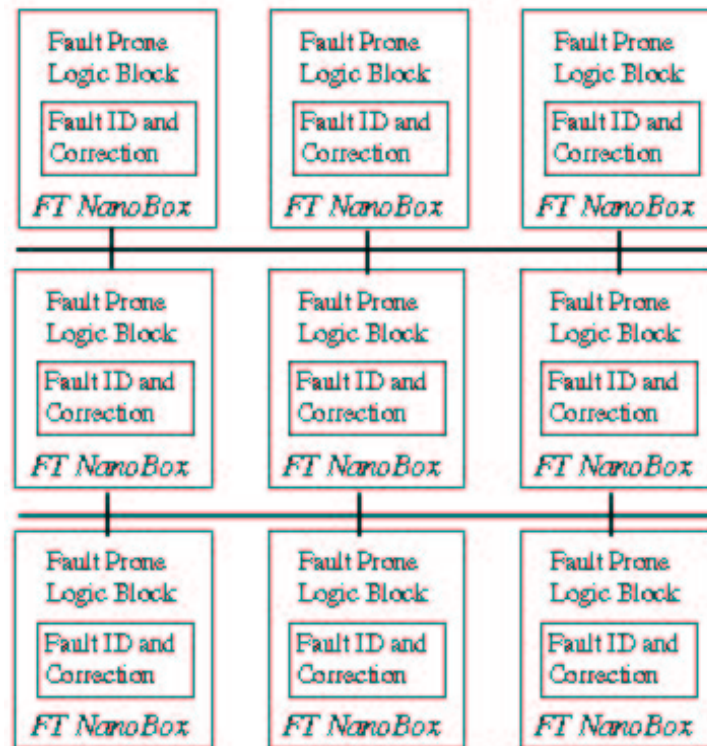

Approach to use external hardware to identify and route around faulty blocks

FT Nano Architectures

NanoBox approach incorporates fault tolerant techniques into black box components

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NanoBox Virtues

➢Abstraction makes circuit design easier

➢NanoBox can be abstracted at varying levels of detail

➢Fault identification and correction is deterministic

NanoBox Vices

➤ NanoBox interconnection errors not accounted for

➤ Keeping distributed FT overhead within reason will be challenging

NanoBox Future Work

➢ At what level to abstract?

➢ Start thinking about inter–NanoBox errors

In Summary

- Intro to our Molecular Technology
  DNA Scaffolding

- Progress to date with DNA Scaffolding
  Assembled rafts with gold clusters and attached rafts to mica

- Future architecture direction
  Encapsulated fault tolerance with self–healing NanoBoxes

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Questions and Discussion

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