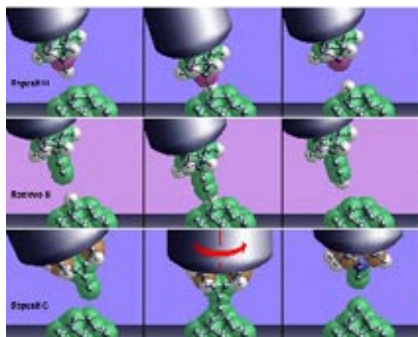


# 1<sup>st</sup> Symposium on MOLECULAR MACHINE SYSTEMS



**October 22, 2004**  
**Crystal City Marriott Hotel**  
**Washington, DC area**

Symposium is held as Day One of “1<sup>st</sup> Conference on  
Advanced Nanotechnology: Research, Applications, and Policy”

Technical advances are leading to the ability to build large, complex devices with atomic precision using molecular machine systems — a prospect first recognized by Richard Feynman over forty years ago. Join nanotechnology researchers as they create the Next Industrial Revolution.

**Keynote: Ray Kurzweil, Winner, National Medal of Technology**

## *Advanced Nanotechnology Research*

**1<sup>st</sup> Symposium on Molecular Machine Systems  
for researchers and technologists**  
**Friday, Oct. 22**

Friday speakers discuss technical research on advanced nanotechnology:

**Nadrian Seeman**, New York University—Three-dimensional DNA construction and computation

**William Goddard**, Caltech—Modeling molecular machine parts and construction

**Ari Requicha**, University of Southern California—Nanorobotics and programmable assembly of molecular-size components by self-assembly and scanning probes

**Ralph Merkle**, Georgia Tech—Computational nanotechnology for molecular machine systems

**Christian Schafmeister**, University of Pittsburgh—A synthetic approach to water soluble nanoscale molecules with controlled structures

**Amar Flood**, UCLA—Artificial molecular machines with mechanically interlocked components, via supramolecular assistance to covalent synthesis

**Tad Hogg**, HP Labs—Control of microscopic robotic systems with simulation examples from nanomedicine applications

**Robert Freitas**, Institute for Molecular Manufacturing—Diamond mechanosynthesis

**J. Storrs Hall**, Molecular Engineering Research Institute—Techniques for the modeling of molecular mechanical systems, and what these enable for the engineering of active nanosystems

**Tihamer Toth-Fejdel**, General Dynamics—Indirectly-replicating nanomachines: a kinematic cellular automata approach

**Friday Evening:**

**Foresight Institute Feynman Prize Banquet**

Awards ceremony for the 2004 Foresight Institute's:

Feynman Prize in Nanotechnology

Foresight Prize in Communication

Distinguished Student Award

## *Topics Covered:*

Introduction to molecular nanotechnology:  
Molecular physics plus systems engineering

Review of technical readiness

Macromolecular design and synthesis:  
What is the state of the art in protein engineering, DNA engineering, 3D structures?

Scanning probe manipulation systems:  
What are the relevant techniques, and what do they enable?

Systems design: What do we now know about the implementation of molecular manufacturing systems? About their performance?

Modeling of molecular mechanical systems and mechanosynthetic operations: What are the techniques, and what do they enable from an engineering perspective?

Systems control: How will these complex systems be programmed? How can the outputs of manufacturing systems be constrained?

Rate of technological advance toward molecular manufacturing

**Panel: Technical readiness for molecular  
manufacturing—A rough consensus**

## *Friday and Saturday evening discussions—(SIGs)*

Special Interest Group meetings:

R&D, Environment, Education, Medical, Military, Space,  
Intellectual Property, Business/Investing, Social Outcomes

**Register by August 30 and SAVE \$\$\$**

[www.foresight.org/MolecularMachineSymposium](http://www.foresight.org/MolecularMachineSymposium)

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