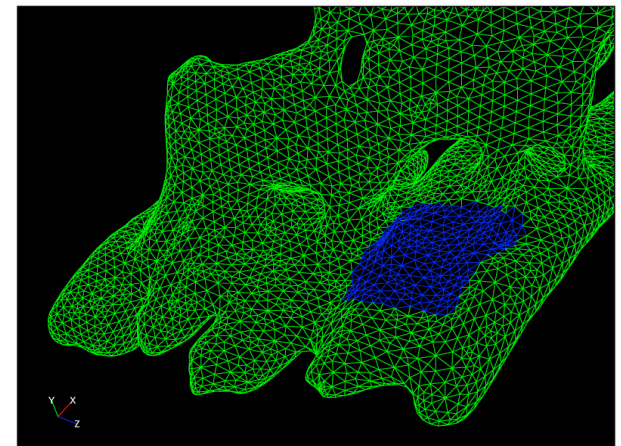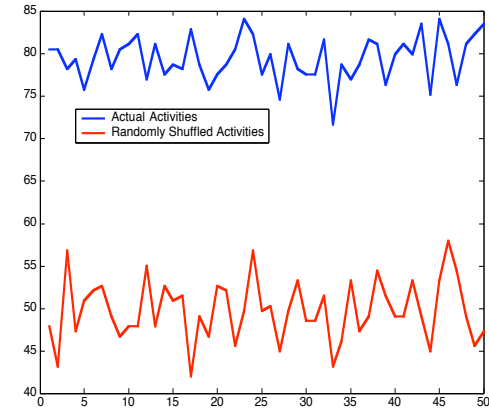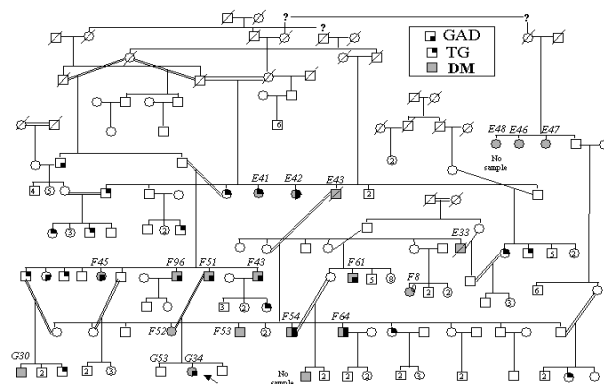# Near-term Potential Practical Wins for Modeling and Simulation of Microbes

## Bioinformatics

- Predicting Domain-Ligand Interaction using Signature Kernel Support Vector Machines

- Natural Language Processing

- Gene Finding, Phylogeny
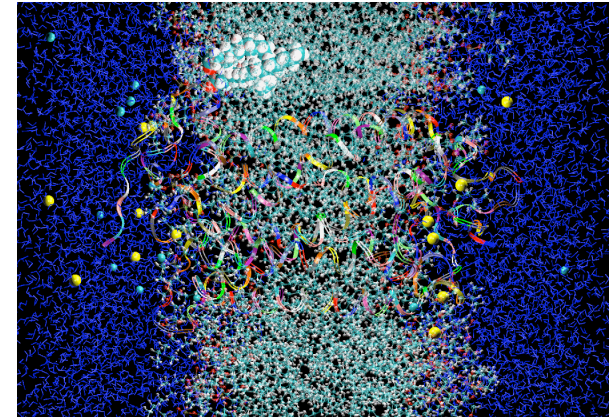
## Hardware & Operating Systems Research

- What does the architecture of the computer look like that can solve these problems?

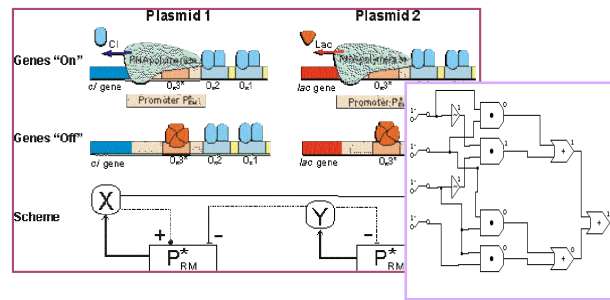# Near-term Potential Practical Wins for Modeling and Simulation of Microbes

**Computational Molecular Biophysics**

- +40ns Simulation of Rhodopsin Membrane Protein System for Insight into the determination of the light-adapted structure
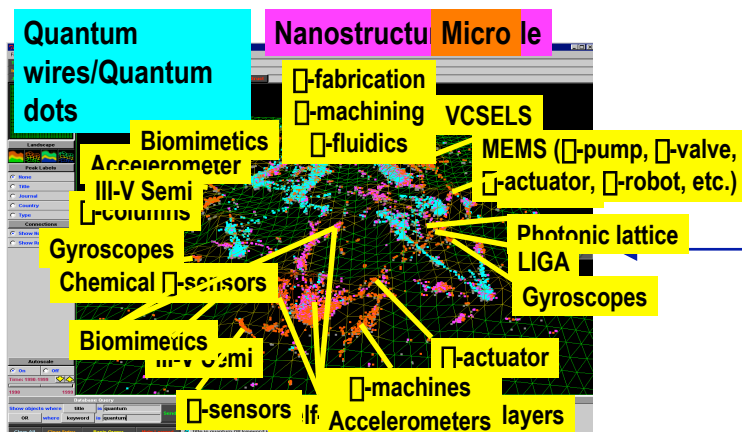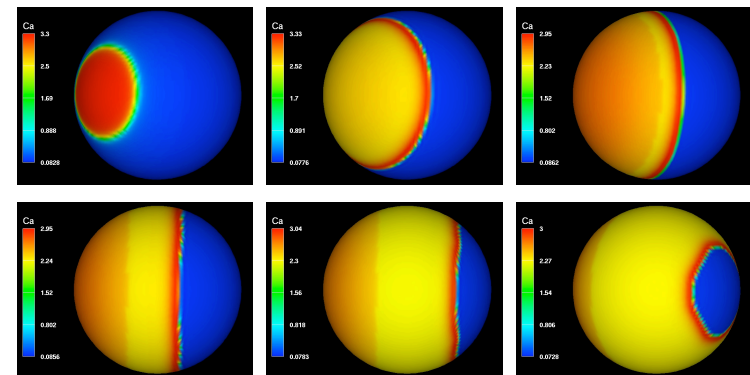
**Complex Systems**

- Network Modeling

**Complex Systems**

- Massively Parallel Finite Elements and Meshing

Quantum wires/Quantum dots

Nanostructu... Micro le

μ-fabrication
μ-machining
μ-fluidics

VCSELS

Biomimetics

Accelerometer

III-V Semi

μ-columns

MEMS (μ-pump, μ-valve, μ-actuator, μ-robot, etc.)

Gyroscopes

Chemical μ-sensors

Photonic lattice

LIGA

Gyroscopes

Biomimetics

III-V Semi

μ-actuator

μ-machines

μ-sensors    If    Accelerometers    layers

**Computational Technologies**

- Parallel Algorithm Development, Optimization, Data Mining and Management and Visualization, Frameworks & User Interfaces

Sandia National Laboratories