Intro to Haptic Interaction

Haptic Devices
Commercially Available

Logitech WingMan Force Feedback Mouse (2D)
Logitech WingMan Force Joystick (2D)
SensAble PHANToM (3D)

Haptic Devices
PHANToM
What is Haptics?
Sensing Haptic Properties

- Temperature
- Pain
- Chemogenic
- Tactile
  - Material: Slip, roughness, hardness, rigidity, stiffness
  - Geometric: Shape, size, features
- Kinesthetic
  - Position, vibration, viscosity, inertia, friction
  - Force distribution/direction/magnitude

How does a haptics device work?

- Hardware
  - Point-force
  - 3DOF vs. 6DOF
- Software
  - Virtual world of objects
    - Graphics
    - Haptics
    - Rendering

Haptic Devices
Successful Applications

- Teleoperation
  - Nanomanipulator controls Scanning Tunneling Microscope
  - Surgical Training
- GROPE: Virtual environment simulating force fields of interacting protein molecules; chemists “dock” molecular components using a 6DOF haptics device to discover low-energy molecular configurations
- Video Games
- Virtual Reality
Haptic Demo

• Using the Phantom for Bone Surgery