

# NCLT Game-based Simulation

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# Motives

- Target users: Grade 7 – 16 (Video game generation)
- To provide intuitive feel
  - Game has 3D visualization, touch, feel & sound effect
    - ⇒ Good to show dynamic features of Nanoworld

# Motives (con'd)

- Interaction is effective in learning
- Zoom-in interface allows students to make logical connections between Nano and Macroscopic worlds

# Related Work

- Haptic interface in Nano education
  - Nanomanipulator by CISMM at UNC-CH
- 3D game interface in Nano education
  - Nanokids by James Tour at Rice University

# Related Work (con'd)

- Game principles in education
  - James Gee and Kurt Squire at UW-Madison
- Video games in education
  - Commercial products: V. Smile (VTech)
  - Games-to-Teach by Henry Jenkins at MIT
    - ⇒ The Education Arcade in joint with Microsoft

# SuperCharged!

- 3D racing game in electromagnetism environment
- Goal
  - To learn electrostatic forces, magnetic fields, and electric fields

# SuperCharged! (con'd)

- How to play

- Navigate the world with joystick by adopting the properties of charged particles and placing other charges in the environment

- Usage

- Adopted as a teaching material in undergraduate physics class at MIT

- Screenshots

# Design Goals

- Videogame Features

- 3D Visualization
- Joystick
  - Navigation
  - Force feedback

- Ambient Learning

- Popup Knowledge (inspired by Popup Videos from VH1)

- Questions in context

- Popup Questions

# Design Goals (con'd)

- Attractive scenarios
  - Challenge-based game
  - Game levels depends on its size
    - Meters (Level 1), millimeters (Level 2), micrometers (Level 3) & nanometers (Level 4)
    - In advancing to the next level, zoom-in interface plays a role

# Design Goals (con'd)

- Attractive scenarios

- Player is given a mission in each level

- Once the mission is completed, players may go to the next level
    - To accomplish the mission, players should make decisions based on their knowledge

# Prototype Demo

- There is no level challenge yet.
- 3D visualization is not fancy enough yet.
- There is no sound effect yet.
- There is no concrete game scenario yet.
- The popup questions here are just selected randomly and not in context. In other words, they may be too difficulty for high school students.