### Objective

- To establish a new approach to understand, predict and control the Mott metal-insulator transition and associated electronic, spin and collective modes at complex metal oxide interfaces.

### Approach

- Sandwich an oxide that exhibits Mott physics between electronically inert oxides to control the apical oxygen bond length and bonding angle.
- State-of-the-art theory, oxide heteroepitaxy, and characterization including microscopy, spectroscopy and transport.

### Technical Success

- N/A.
- FY2009 new start.

### Schematic of a perovskite oxide.

The TM-O-TM bond length and angle controls the Mott physics.
Emergent Phenomena at Mott Interfaces

Potential Scientific Impact
• High quality oxide heteroepitaxial capabilities for novel material systems
• Discovery of novel electronic phenomena
• Defect control in oxides

Potential Payoff
• Improvements in battlespace awareness through
  – Advanced imaging technology
  – New sensors
• Improved survivability and mobility through
  – Reduced size and energy requirements of electronic devices
• Advanced computational capabilities through functionality un-obtainable with semiconductor technologies