

# *Chez Pierre*

Presents ...

**Monday, November 28, 2016**

**12:00pm Noon**

**MIT Room 4-331**

**Chez Pierre Seminar**

**Darrell Schlom - Cornell University**

“Thin-Film Alchemy:

Using Epitaxial Engineering to Unleash the Hidden Properties of Oxides”

Unparalleled properties—those of hidden ground states—are being unleashed by exploiting large strains in concert with the ability to precisely control dimensionality and stabilize metastable phases in epitaxial oxide heterostructures. For example, materials that are not ferroelectric or ferromagnetic in their unstrained state can be transmuted into materials that are both at the same time. Similarly, we exploit epitaxial engineering to tune the band structure of the complex oxide ruthenates:  $\text{CaRuO}_3$ ,  $\text{SrRuO}_3$ , and  $\text{BaRuO}_3$ , with the perovskite structure as well as their two-dimensional counterparts  $\text{Ca}_2\text{RuO}_4$ ,  $\text{Sr}_2\text{RuO}_4$ , and  $\text{Ba}_2\text{RuO}_4$ . The band structure is revealed by high-resolution angle-resolved photoemission (ARPES) on pristine as-grown surfaces of these complex oxides made possible by a direct ultra-high vacuum connection between molecular-beam epitaxy (MBE) and ARPES systems. Our work demonstrates the possibility of utilizing strain engineering as a disorder-free means to manipulate emergent properties and many-body interactions in correlated materials.

