Abstract:   
  
The talk will focus on the common occurrence of a variable metal-oxygen ratio in many inorganic oxides and its consequences for a diverse range of electrical properties and applications. Comparisons will be made between the occurrence of non–stoichiometry in many oxides and the exact stoichiometry of molecular compounds. In some cases, oxygen in oxides is more than just an inert O2- packing ion in a crystal structure, but can take part in redox processes similar to transition metal cations. Topics covered in the talk should include: lithium battery cathodes, black rutile, p-n transitions in oxide ceramics and memristive switching phenomena, to illustrate the underlying physical processes responsible for the diverse range of properties.