Like many correlated electron systems, manganites exhibit unusual electronic properties. They are best known for colossal magnetoresistance: applying a magnetic field can result in an increase of conductivity of orders of magnitude. This effect occurs in part because multiple phases coexist within a uniform single-crystal sample. I will give an introduction to correlated electron systems and the physics of manganites, and discuss x-ray techniques that allow us to measure the individual coexisting ordered phases.