Dr. Frank Hawthorne,  
Distinguished Professor, Department of Geological Sciences  

Date: Thursday, March 19th, 2015  
Time: 1:00 p.m. - 2:00 p.m.  
Place: Klaus Hochheim Theatre  
(5th floor, Wallace Building)  

Abstract: We cannot a priori predict the arrangements of atoms in solids. This is a particularly significant issue when trying to understand very complicated minerals of environmental importance. Here, I develop a novel method to deal with complicated chemical compositions and atomic arrangements in crystalline solids (particularly minerals) by incorporating information on topological aspects of atomic arrangements directly into chemical formulae, and writing a general chemical-structure formula that is conformable with some general structure-building algorithm. In this way, we produce generating functions that both organize and predict chemical compositions and atomic arrangements for specific structure-building algorithms. I will develop a structure-generating function that organizes several hundred silicate minerals and has predicted the formula and structure subsequently discovered minerals.  

Biography: Frank Hawthorne is a Distinguished Professor in the Department of Geological Sciences, U of M. He works on understanding and predicting the arrangements of atoms in solids, and on the crystal structure, spectroscopy and microbeam analysis of a wide variety of complex minerals. He is an Officer of the Order of Canada, a Killam Laureate, a Foreign Member of the Russian Academy of Sciences, and a Fellow of the Royal Society of Canada.