Abstract
Structural phase transitions where the low-symmetry phase exhibits a physical quantity not present in the high-symmetry phase can be parametrized in terms of that quantity (called the order parameter). If this physical quantity can be described in terms of axis, magnitude, and binary sign, then it can be associated to one of eight vectors and bidirectors, also called vectorlike quantities. By reason of symmetry, an exhaustive search can determine the rules governing which "species" of structural phase transition allow or disallow spontaneous components of said quantity. In this talk, I will introduce the eight vectorlike quantities, the finite list of species of structural phase transitions including time-reversal symmetry, and lastly share some recent work that determines the irreducible character of these quantities in terms of the 122 Heesch-Shubnikov point groups. The aim of this research is to provide a framework, tools, and data useful to researchers in their hunt for exotic material properties such as ferroelectric skyrmions and electromagnons.

Short Bio
Kay Condie Erb received Bachelor and Master's diplomas in Utah from Brigham Young University and the University of Utah. He was in a Medical Physics PhD program at University of Utah but later decided to change the field of research and switched to studying condensed matter Physics in Charles University in Prague. He is also currently a researcher at the Czech Academy of Sciences. Though most of his formal training and experience is in physics, he had extensive informal training and professional experience in computer science.