

## Keynote Lecture

KN18

### *The expanding scope of crystallographic representational analysis*

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The characterization of a distorted crystal structure, such as might arise from a symmetry-lowering phase transition, is often enhanced by the use of a symmetry-motivated parameter set obtained from group representation theory. These “symmetry-mode” parameters effectively reorganize the traditional parameters (e.g. atomic coordinates, magnetic moments, site occupancies, and cell parameters) that describe how the distorted structure differs from its high-symmetry parent. Representational analysis has been an important facet of crystallography for over 75 years now, particularly as it relates to continuous phase transitions and magnetic structures. The growing interest in the subject today follows on the heels of greatly expanded capabilities, a broader range of applications, and more accessible resources. In this context, I will review key developments that have led us to the present state of the art, explore exciting examples from the current literature, and demonstrate that representational analysis is an area rich with opportunities to innovate.

**Keywords:** phase transition, irreducible representation, symmetry mode