Waves in lattices

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Linear waves in architectured lattice materials exhibit startling complexity, with ramifications to a range of practical applications- from transportation to energy and health areas. Our ability to manipulate wave transport, at length scales at and below a propagating wave's length, is enhanced through unprecedented control to engineer topological architecture and material hierarchy.
This seminar will focus on linear waves in lattices, with and without dissipation effects. First, linear elastic wave transport in the bulk and on the edges of a generic lattice will be encapsulated within eigenvalue problems. An appealing aspect of these 'dynamic' eigenvalue formulations is their ability to reproduce 'static' solutions at zero frequency. St. Venant's decay of stress from a free edge will be considered from the perspective of the unusual case of a Kagome lattice. Then, a practical application problem of vibroacoustic transport in a sandwich panel will be considered where, the elastic waves in the solid interact with pressure waves in the surrounding fluid. Using finite element simulations the advantages of a lattice core will be highlighted. Finally, non-trivial role of dissipation on waves in a lattice is considered in the context of exceptional points with topological consequences.

Biography: Dr. Srikantha Phani (Srikanth) received his PhD from University of Cambridge in 2004. After a postdoctoral fellowship at Cambridge he worked at University of Bath, UK. His research interests are in dynamics of materials and structures and mechanics at small scale. His research group strives to marry theory with experiment, where possible.
He was awarded a Canada Research Chair and a Killam teaching prize, both at UBC, where he is now a tenured associate professor.