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**NILIMA NIGAM**, Simon Fraser University

*When mathematicians play the drums*

By now it is almost a cliché that mathematics and music are deeply intertwined human endeavours. Humans are naturally drawn to patterns, and patterns are fundamental to both music and mathematics. We think of notes and chord progressions; we think of how our favorite music reveals intricate and beautiful mathematical structures.

In this talk, we'll explore another facet of this relationship: how the use of mathematics can help with the design of instruments, and how the misuse of mathematical tools leads to a mess! Why are the drums in the percussion section of an orchestra shaped the way they are? How can mathematics help us construct instruments with particular musical characteristics? What is meant in this setting by the 'misuse' of mathematical tools, and how can we prevent a cacaphony?

Along the way, we'll learn a bit about geometry, numerical analysis and spectral theory. Above all, we'll hopefully learn a bit about designing a drum.