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**WASHINGTON TAYLOR, MIT**

*Classification and enumeration of elliptic Calabi-Yau threefolds and fourfolds*

Recent work motivated by physics has led to progress in understanding elliptic Calabi-Yau threefolds and fourfolds, using new mathematical and computational tools for analyzing the geometry of the bases that support such fibrations. This talk will give an introduction to some aspects of this research program, including: the identification (work with D. Morrison) of irreducible geometric structures in the base geometry that facilitate the classification of allowed bases, connections between codimension two singularities and representation theory, Mordell-Weil groups, a systematic approach to enumerating elliptic Calabi-Yau threefolds with large  $h_{2,1}$ , and a Monte Carlo study of  $\sim 10^{50}$  distinct toric threefold bases that support elliptic Calabi-Yau fourfolds. A brief description will also be given of applications to physics including hints at how the observed standard model of particle physics may emerge from "typical" features of Calabi-Yau fourfolds.