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Understanding the geometry of a (compactified) moduli space via tropical geometry

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In the last few years, tropical methods have been applied quite successfully in understanding several aspects of the geometry of classical algebro-geometric moduli spaces. In particular, in several situations the combinatorics behind compactifications of moduli spaces have been given a tropical modular interpretation. Consequently, one can study different properties of these (compactified) spaces by studying their tropical counterparts. The most studied example is the moduli space of curves, whose tropicalization is identified with an intrinsic topological retraction of its Berkovich analytification. Recent breakthrough results and techniques due to Chan-Galatius-Payne allow moreover to compute some topological invariants of such moduli spaces via tropical geometry. In this talk, I will illustrate this phenomena and explain how to apply similar techniques in understanding the geometry and topology of other spaces, as the moduli space of spin curves and the moduli space of Abelian varieties. The talk is partially based in joint work with Marco Pacini and Lucia Caporaso and with Madeleine Brandt, Juliette Bruce, Melody Chan, Gwyneth Moreland and Corey Wolfe.