Lines on cubic surfaces in the tropics

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Since the beginning of tropical geometry, a persistent challenge has been to emulate tropical versions of classical results in algebraic geometry. The well-know statement ""any smooth surface of degree three in P^3 contains exactly 27 lines'' is known to be false tropically. Work of Vigeland from 2007 provides examples of tropical cubic surfaces with infinitely many lines and gives a classification of tropical lines on general smooth tropical surfaces in TP^3.

In this talk I will explain how to correct this pathology by viewing the surface as a del Pezzo cubic and considering its embedding in P^44 via its anticanonical bundle. The combinatorics of the root system of type E_6 and a tropical notion of convexity will play a central role in the construction. This is joint work in progress with Anand Deopurkar.