Tropical ideals

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The recent scheme-theoretic approach to tropical geometry has motivated the study of "tropical ideals," which are ideals in the algebra of tropical polynomials that are also tropical linear spaces. While the class of arbitrary ideals can behave very badly, tropical ideals exhibit many nice properties, while also presenting many new features, challenges, and mysteries. There are realizable tropical ideals, meaning that they are formed by tropicalizing classical ideals, and there are non-realizable tropical ideals. Three interesting questions are:

1. What invariants of a classical ideal are encoded in its associated tropical ideal?

2. How does the tropicalization of an ideal change as the ideal changes (moving within the Hilbert scheme)?

3. How can one construct non-realizable tropical ideals?

In this talk I will discuss examples, progress on each of these questions.