Tropical Representations of Plactic Monoids

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I will discuss recent joint work with Marianne Johnson, which shows how to represent the plactic monoid of each finite rank as a monoid of upper triangular matrices over the tropical semiring. This answers a question first posed by Izhakian, and also proves a conjecture of Kubat and Okninski which states that every plactic monoid of finite rank satisfies a non-trivial semigroup identity. I will also mention some recent work on free objects in the varieties generated by upper triangular matrices over commutative semirings, including in particular the variety generated by the bicyclic monoid