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**Applications of Heegaard-Floer theory to knot and link concordance**

*Abstract:* Knots in the 3-sphere are said to be concordant if they co-bound an annulus in  $S^3 \times I$ ; there is a similar definition for links. A knot is said to be slice if it is concordant to the trivial knot. There are really two equivalence relations that one can consider, depending on whether this annulus is to be smoothly or merely topologically embedded. Freedman's theorem that knots with trivial Alexander polynomial are topologically slice, together with Donaldson's theorem from gauge theory, imply that there is a difference between the topological and smooth cases. I will explain joint work with M. Hedden and C. Livingston, showing that there are knots that are topologically slice, yet not smoothly concordant to a knot with trivial Alexander polynomial. Related ideas give rise to subtle differences between smooth and topological link concordance. The proofs use invariants from Heegaard-Floer theory.