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Hunting for surfaces: a computer-aided approach to constructing surfaces in projective four-space

This talk explores a long-standing problem in classifying algebraic surfaces in projective four-space, inspired by the work of Ellingsrud and Peskine in the 1980s. I will review the classification problem and discuss recent progress, including our new findings. I will also introduce a companion Macaulay2 package developed to support these computations and to encourage further exploration of this classification problem. This is joint work with Kristian Ranestad and Frank-Olaf Schreyer.