Colloquium **"Four Facets of Modern Statistics, and a Surprise!"**
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Semiparametric estimation in very high-dimensional models

After a review of semiparametric estimation theory, we discuss estimation of functionals in some (special) models that are so high-dimensional that the usual square root n rate of estimation is not attainable. We discuss a heuristic approach for estimator construction and some lower bounds for estimation.