

UNIVERSITY OF SYDNEY

SCHOOL OF MATHEMATICS AND STATISTICS

Statistics Seminar

Friday, 15 April, 2.00pm

Carslaw 173

## **Risk hull method for inverse problems**

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### **Abstract**

We study a standard method of regularization by projections of the linear inverse problem  $Y = Af + \epsilon$ , where  $\epsilon$  is a white Gaussian noise, and  $A$  is a known compact operator with singular values converging to zero with polynomial decay. The unknown function  $f$  is recovered by a projection method using the SVD of  $A$ . The bandwidth choice of this projection regularization is governed by a data-driven procedure which is based on the principle of the risk hull minimization. We provide non-asymptotic upper bounds for the mean square risk of this method and we show, in particular, that in numerical simulations, this approach may substantially improve the classical method of unbiased risk estimation.

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