

Abstract Submitted  
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**Recent progress in the estimation of laminar and turbulent wall-bounded flows** THOMAS BEWLEY, (UCSD), BARTOSZ PROTAS, (McMaster), JEROME HOEPFFNER, MATTIAS CHEVALIER, DAN HENNINGSON, (KTH), PAOLO LUCHINI, (UNISA) — We present recent progress on a range of techniques to estimate the flow state based on a history of noisy measurements from an array of flush-mounted skin-friction and pressure sensors on a wall:

- (A) **Model predictive estimation** (a.k.a. 4D-var) in a “**multiscale retrograde**” framework (Bewley & Protas, *Physica D* 2004);
- (B) **Kalman filtering** based on an artificial (but sufficiently smooth) stochastic model for the covariance matrix characterizing the statistics of the state disturbance forcing (Hoepffner *et al.*, *JFM* 2005);
- (C) **Extended Kalman filtering** based on a covariance matrix derived from a DNS of a turbulent flow (Chevalier *et al.*, *JFM* submitted); and
- (D) **Weiner filtering** derived from DNS-based impulse response functions.

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