1. Training Design Training Dimension Model Generation Reduction Fitting Runs $\{\mathbf{y}_i^{\mathrm{train}}\}_{i=1}^{n_{train}}$ x_2 TRACE x_1 x_1 $\{\mathbf{x}_i^{\mathrm{train}}\}_{i=1}^{n_{train}}$ 2. Validation and Selection $\{\mathbf{x}_{i}^{\text{Valid}}\}_{i=1}^{n_{valid}}$ $\{\mathbf{x}_i^{\text{test}}\}_{i=1}^{n_{test}}$ Validation Met-Model Validation Dimension → Prediction ric Calculation Reduction Selection Runs $Q_2(\hat{f}(\mathbf{x}_i^{\text{valid}}), y_i^{\text{valid}})$ $\{\mathbf{y}_i^{\text{Valid}}\}_{i=1}^{n_{valid}}$ $\hat{f}(\mathbf{x}_i^{\text{valid}}) \approx y_i^{\text{valid}}$ 3. Testing Testing Dimension ➤ Prediction < Reduction Runs $\hat{f}(\mathbf{x}_i^{\text{test}}) \approx y_i^{\text{test}}$ $\{\mathbf{y}_i^{\text{test}}\}_{i=1}^{n_{test}}$ Final Error Assessment