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**Calibration of Blood Flow in Simulations via Multi-fidelity Bayesian Optimization** PARIS PERDIKARIS, Massachusetts Institute of Technology, GEORGE KARNIADAKIS, Brown University — We present a mathematical and computational framework for model inversion based on multi-fidelity information fusion and Bayesian optimization. The proposed methodology targets the accurate construction of high-dimensional response surfaces, and the effective identification of global optima while keeping the number of expensive function evaluations at a minimum. We train families of correlated surrogates on available variable fidelity data using auto-regressive stochastic models via recursive co-kriging, and exploit the resulting predictive inference schemes within a Bayesian optimization setting. The effectiveness of the proposed framework is illustrated through examples involving the calibration of outflow boundary conditions in blood flow simulations using multi-fidelity information from 3D and 1D models.

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