Greedy sensor placement with cost constraints and noise EMILY
CLARK, University of Washington, TRAVIS ASKHAM, New Jersey Institute of
Technology, STEVEN BRUNTON, NATHAN KUTZ, University of Washington —
The problem of optimally placing sensors under a cost constraint arises naturally in
the design of industrial and commercial products, as well as in scientific experiments,
including the reconstruction of fluid flows from incomplete measurements. We con-
sider a relaxation of the full optimization formulation of this problem and extend a
well-established greedy algorithm for the optimal sensor placement problem without
cost constraints. We then modify our framework to account for the more realistic
case of noisy measurements, and consider the problem of placing two different types
of sensors: expensive high-fidelity sensors, and cheaper, noisier sensors. We develop
guidelines for choosing the number and location of each type given a set budget. We
demonstrate the effectiveness our methods on data sets related to fluid mechanics,
geophysical fluid flows, and facial recognition.

Emily Clark
University of Washington