Lecture 23: Bayesian global optimization

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Expected improvement - With observation noise

Expected Improvement for Noisy Functions

- Cannot use $\max_{1 \leq i \leq n} y_i$ because of the noise.
- Instead we use the maximum of the predictive mean of the observations: $\max_{1 \leq i \leq n} m_n^*(\mathbf{x}_i)$.
- And also, instead of comparing to y (experimental observation), we are comparing to $f(\mathbf{x})$ conditional on y.
- See notes for how EI is modified.

PREDICTIVE
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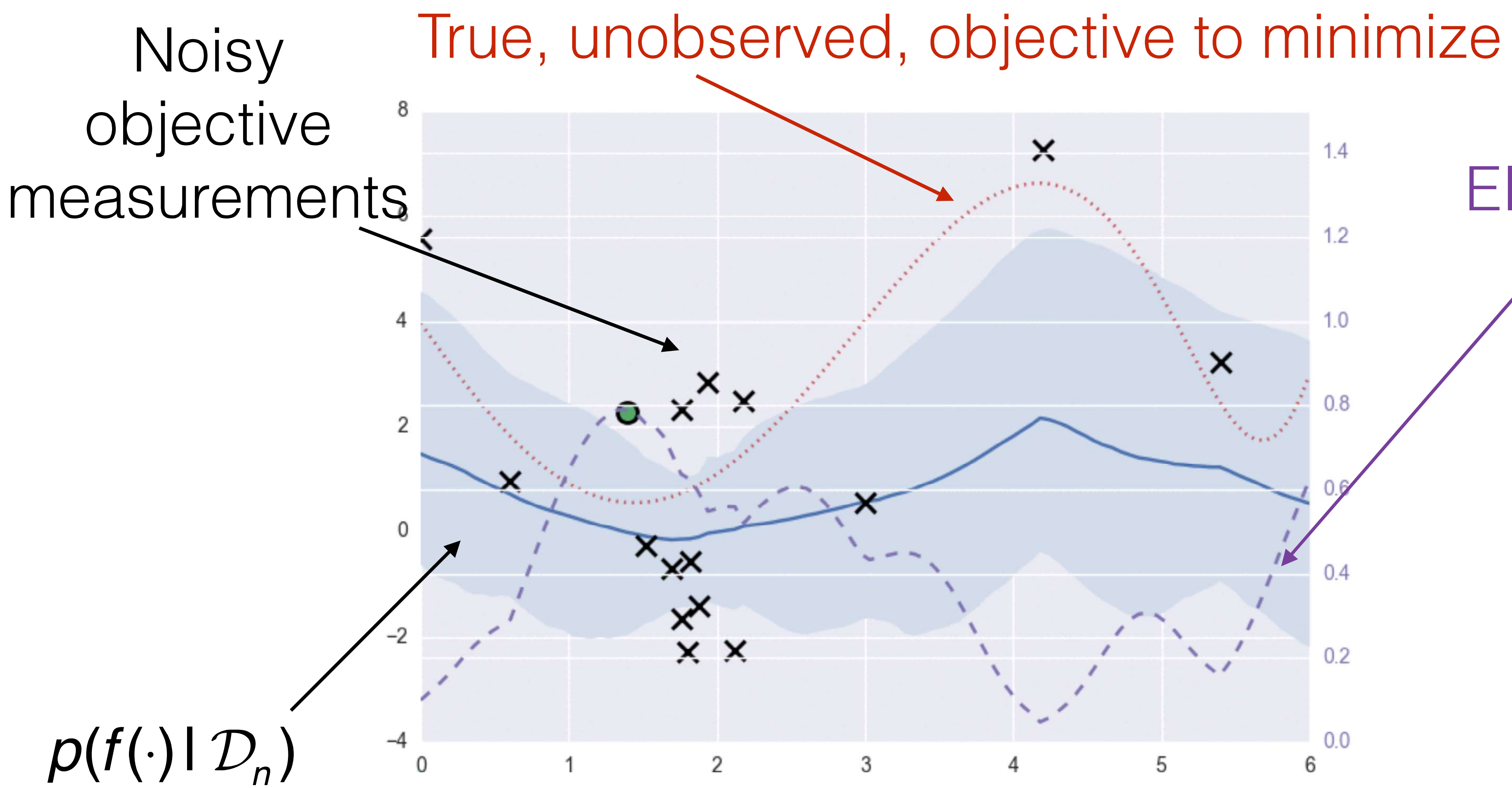
Example: Noisy minimization



(Pandita and Bilionis, 2016)