

# Lecture 23: Bayesian global optimization

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## The value of information

# The value of information

- The value of information (Vol) depends on what you want to do.
- Can be quantified objectively if:
  - you have assigned probabilities over all possibilities.
  - you can quantify your profit/loss if any of the possibilities happen.

# The value of information

Vol of **x** = how much expected gain if I measure at **x**

= expected profit if I measure at **x**

- current best alternative

= expected income if I measure at **x**

- cost of measuring **x**

- current best alternative

# Acquisition functions as proxies for the value of information

- Most of the times, we don't have the details to find the Vol.
- We use heuristic approximations to Vol such as:
  - the probability of improvement
  - the expected improvement
  - the knowledge gradient
  - the expected information gain
  - ...