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AUTOMATIC CONTROL LABORATORY IFA

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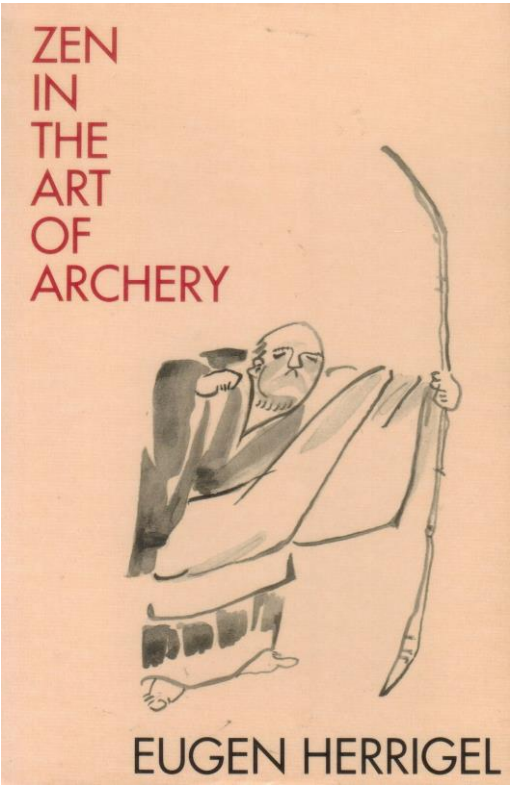
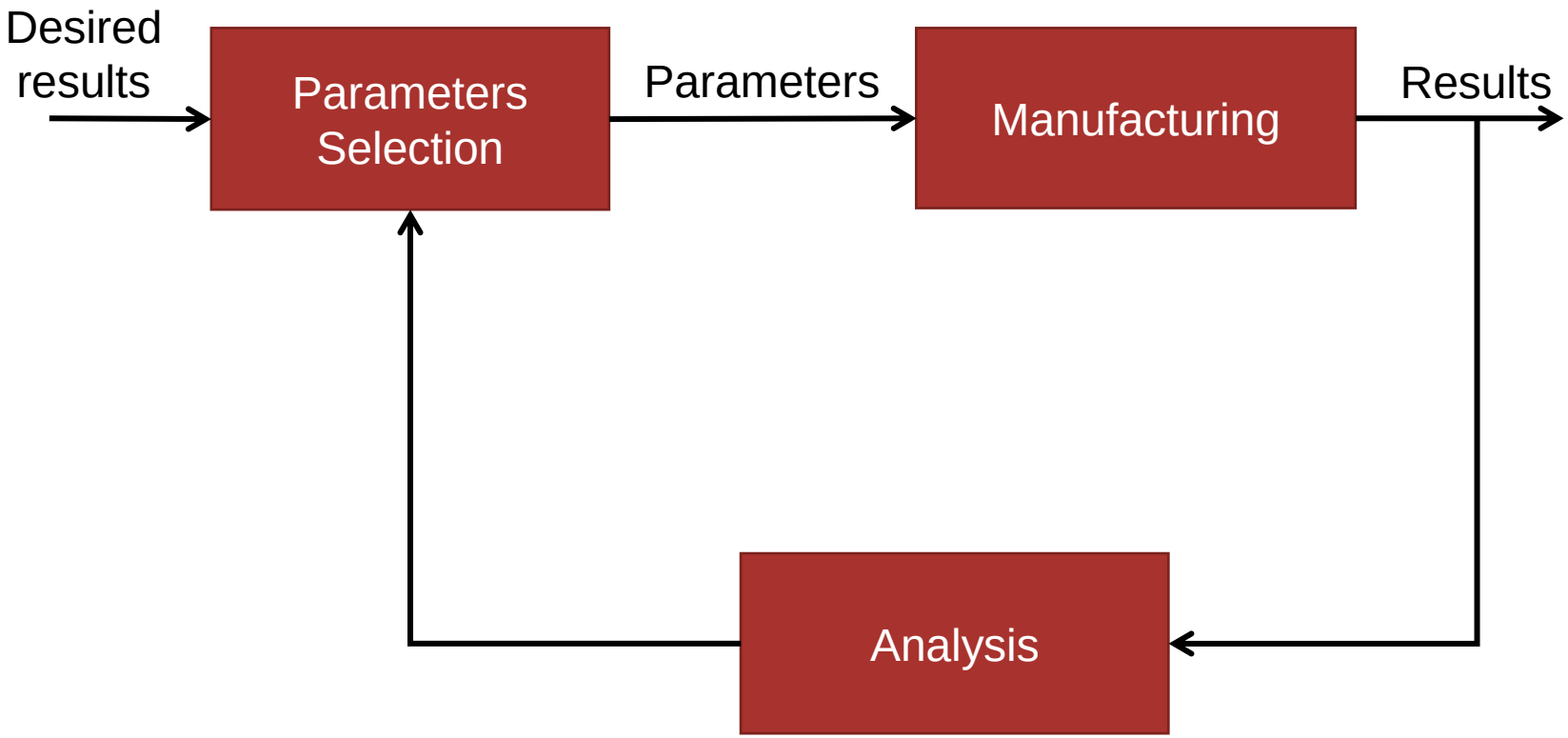
Plasma Spray Process Parameters Configuration using Sample-efficient Batch Bayesian Optimization

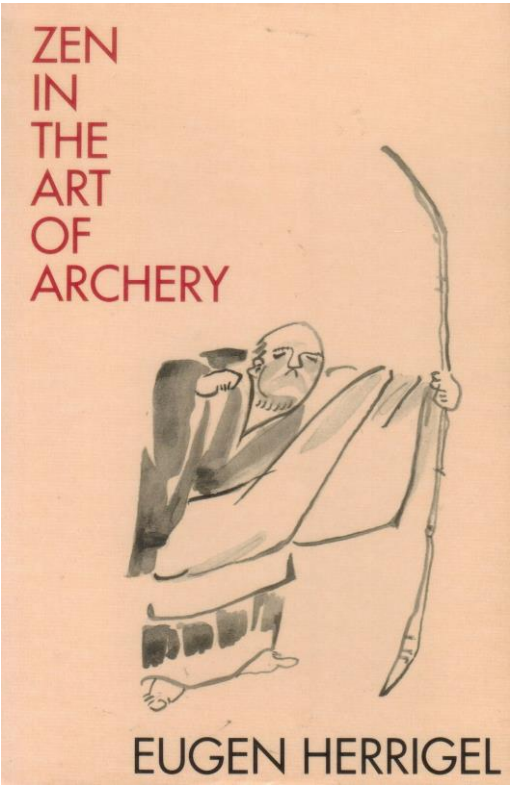
Xavier Guidetti
Doctoral Student
11.11.2021, SAMCE Online Event

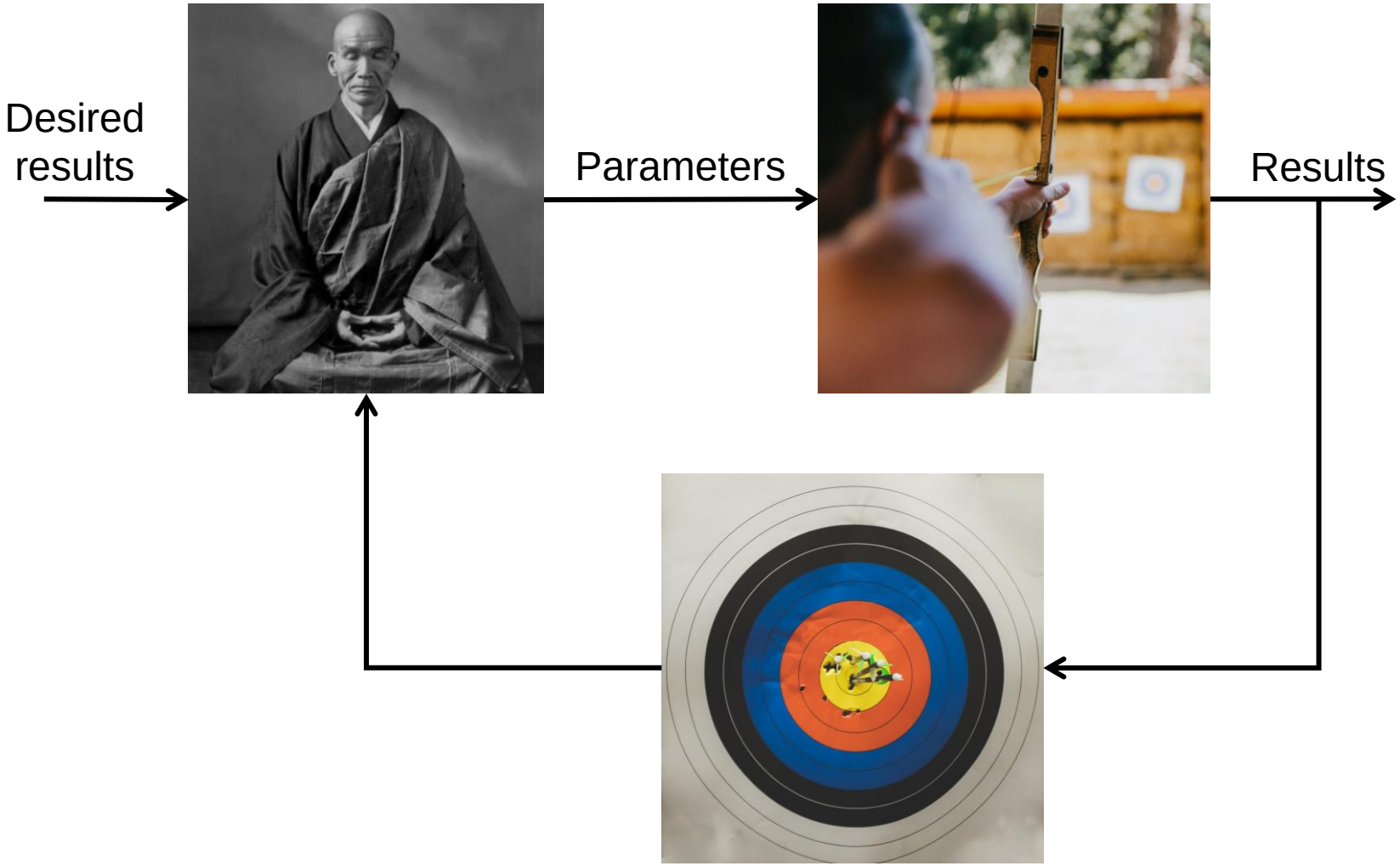
Drawing Arrows in the Dark



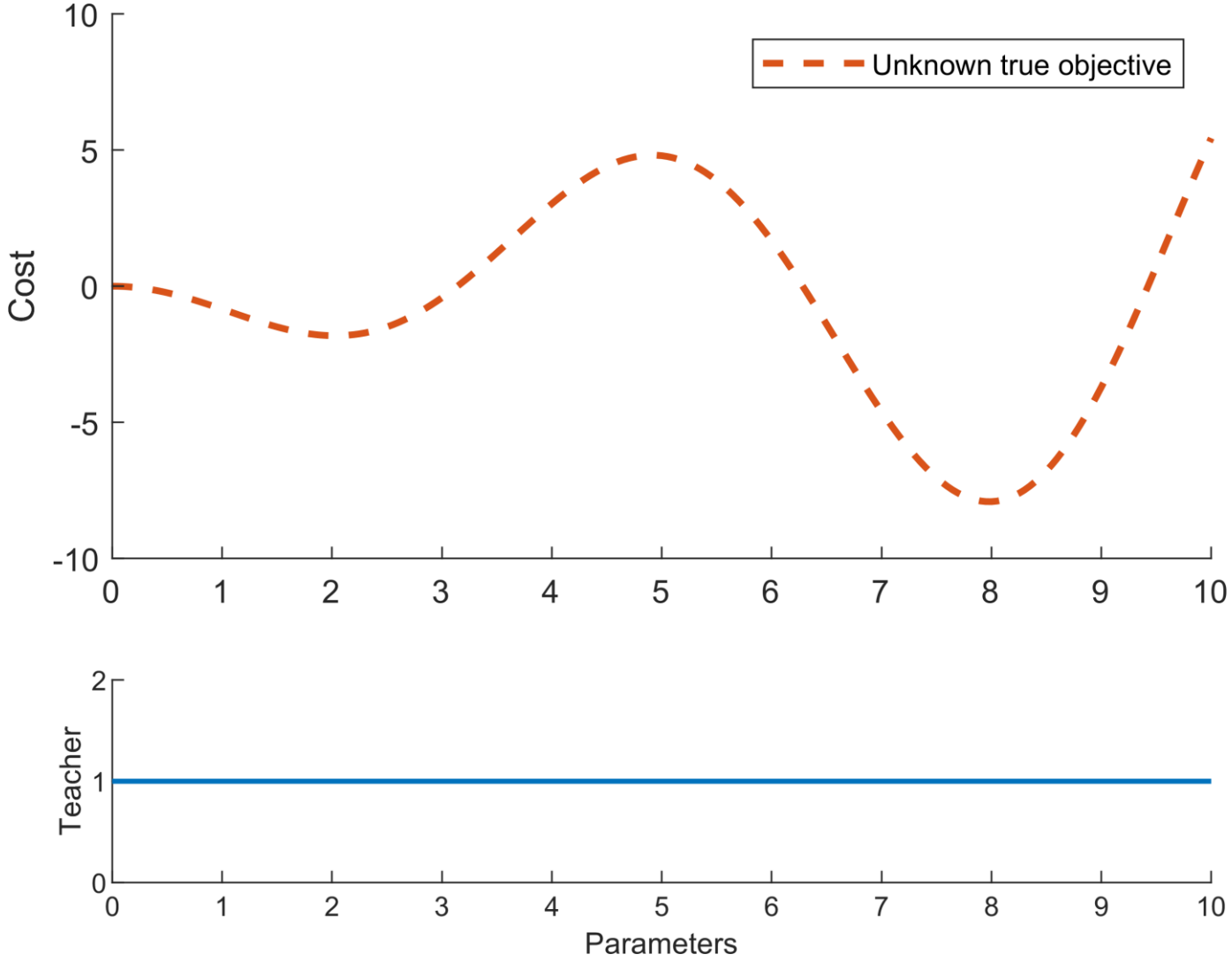


Drawing Arrows in the Dark

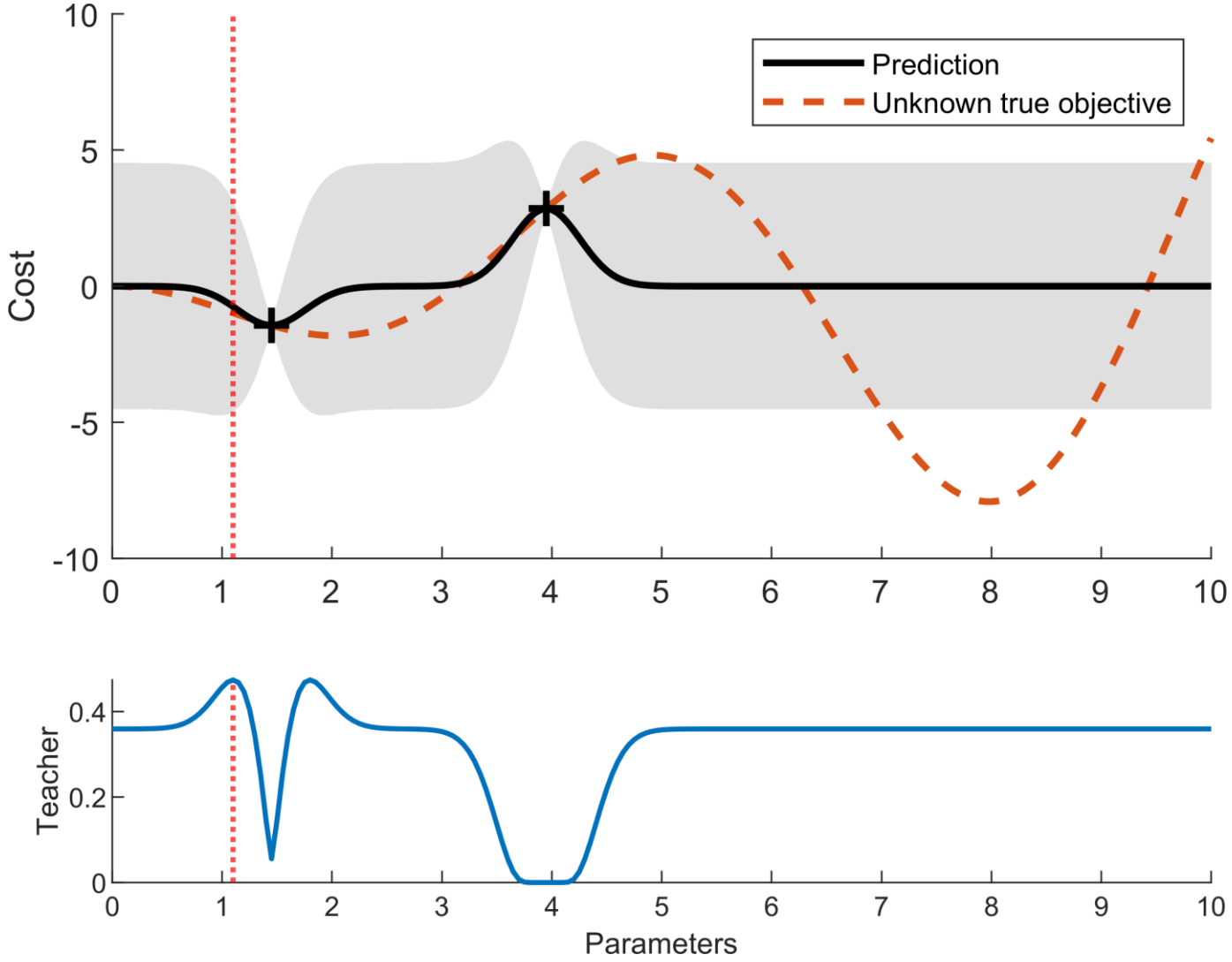




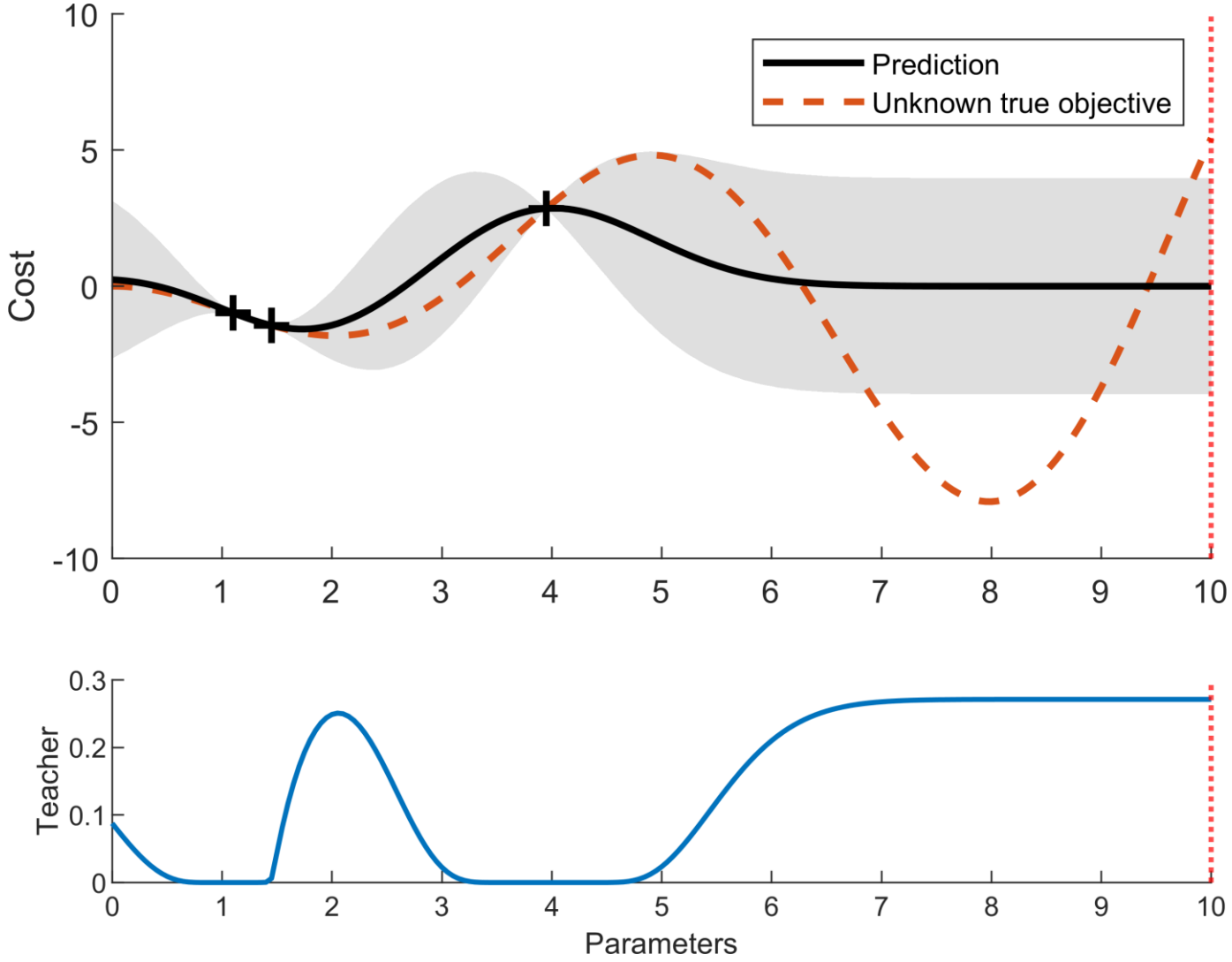
An Unknown Objective



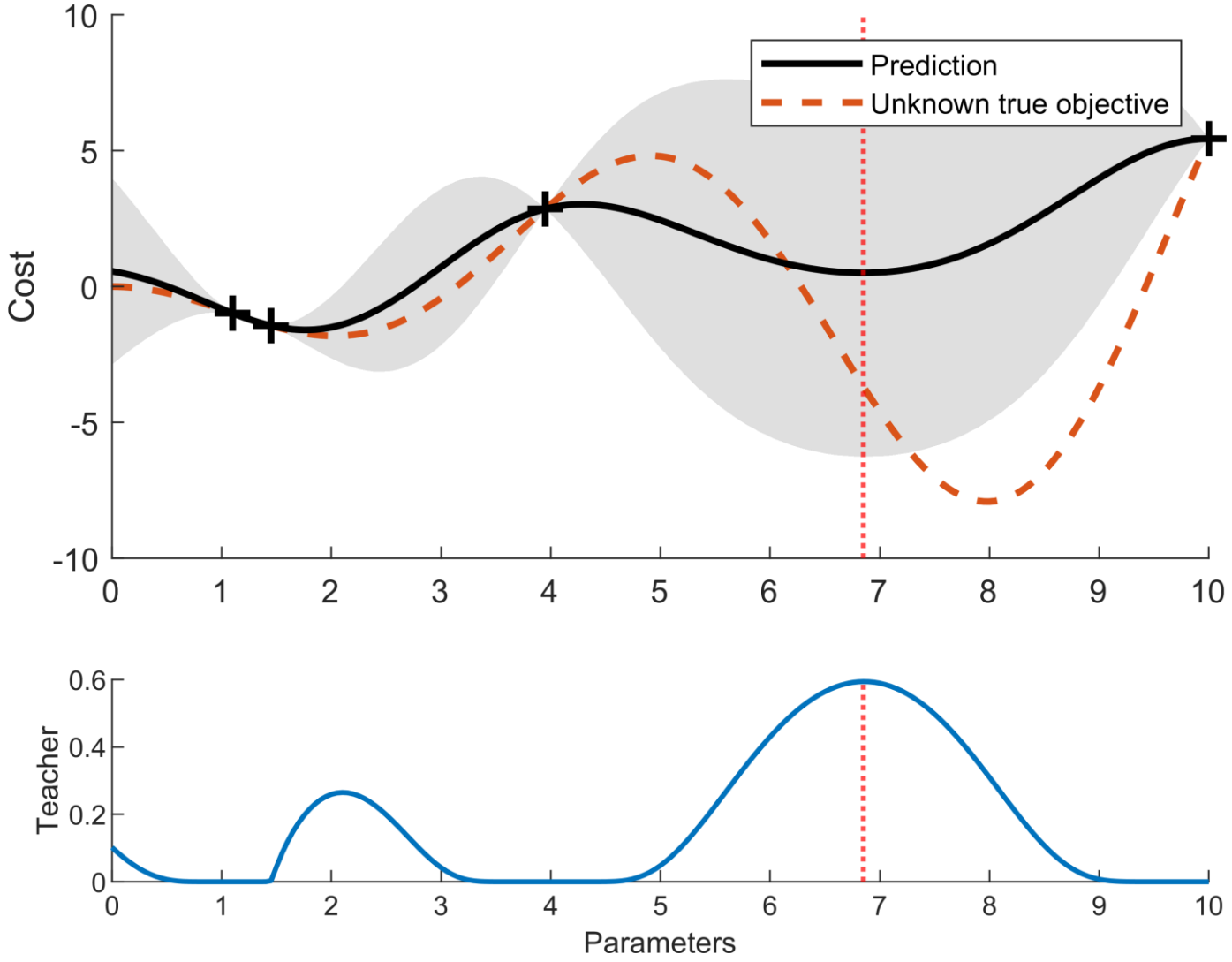
Two Arrows


Prediction
Unknown true objective
Cost
10
5
0
-5
-10
0
1
2
3
4
5
6
7
8
9
10
Teacher
0.4
0.2
0
Parameters

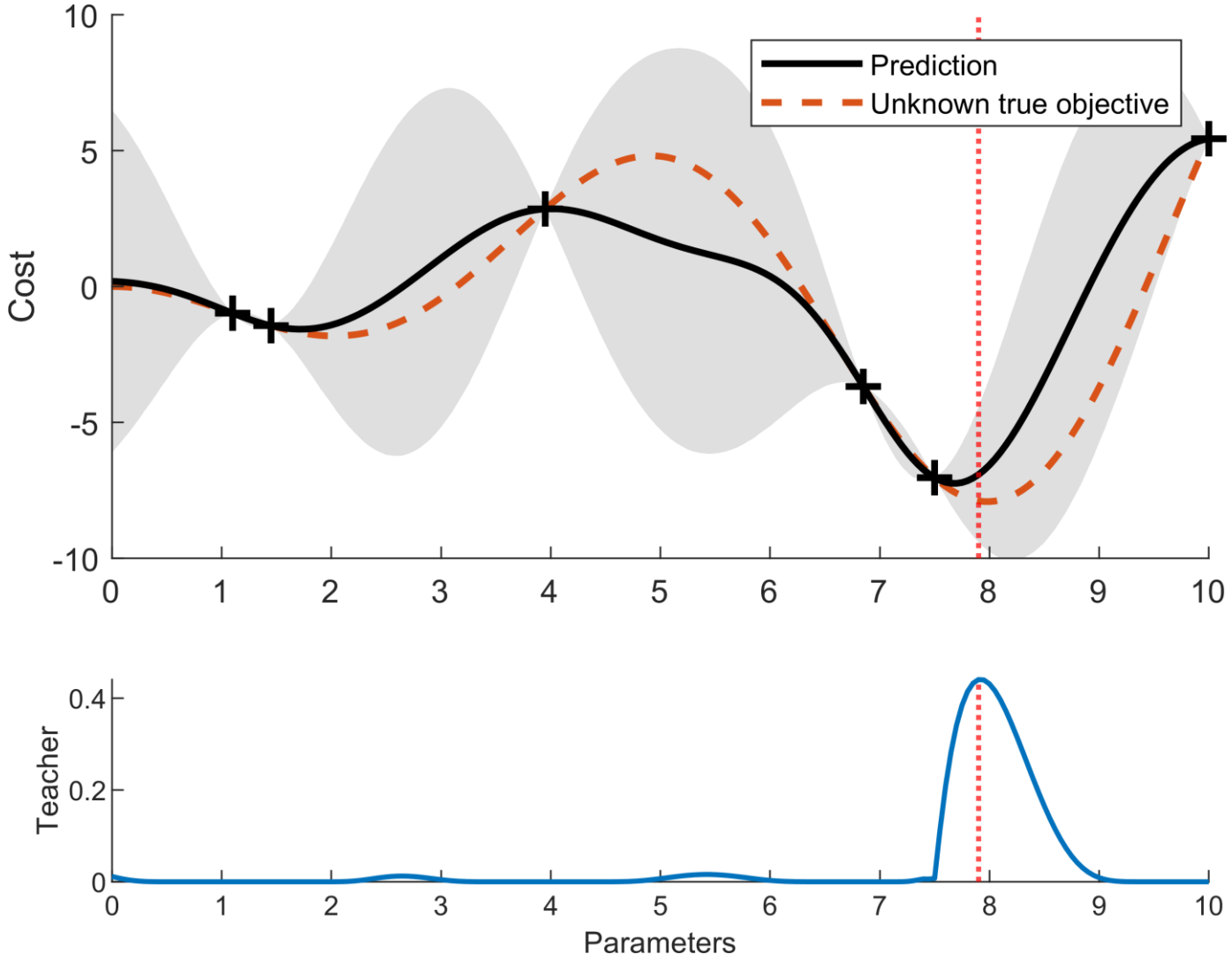
The Teacher's Advice

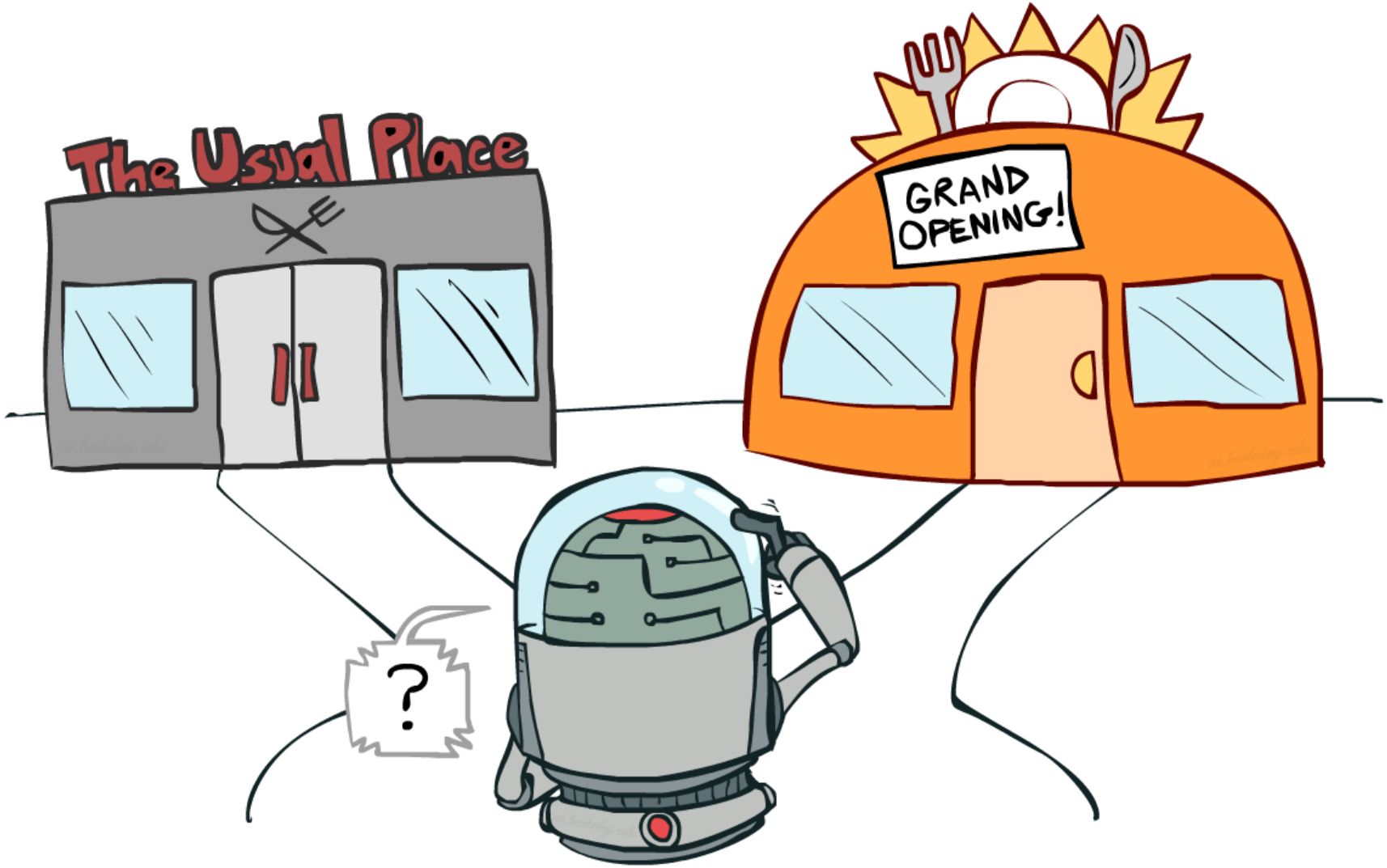


Narrowing Down



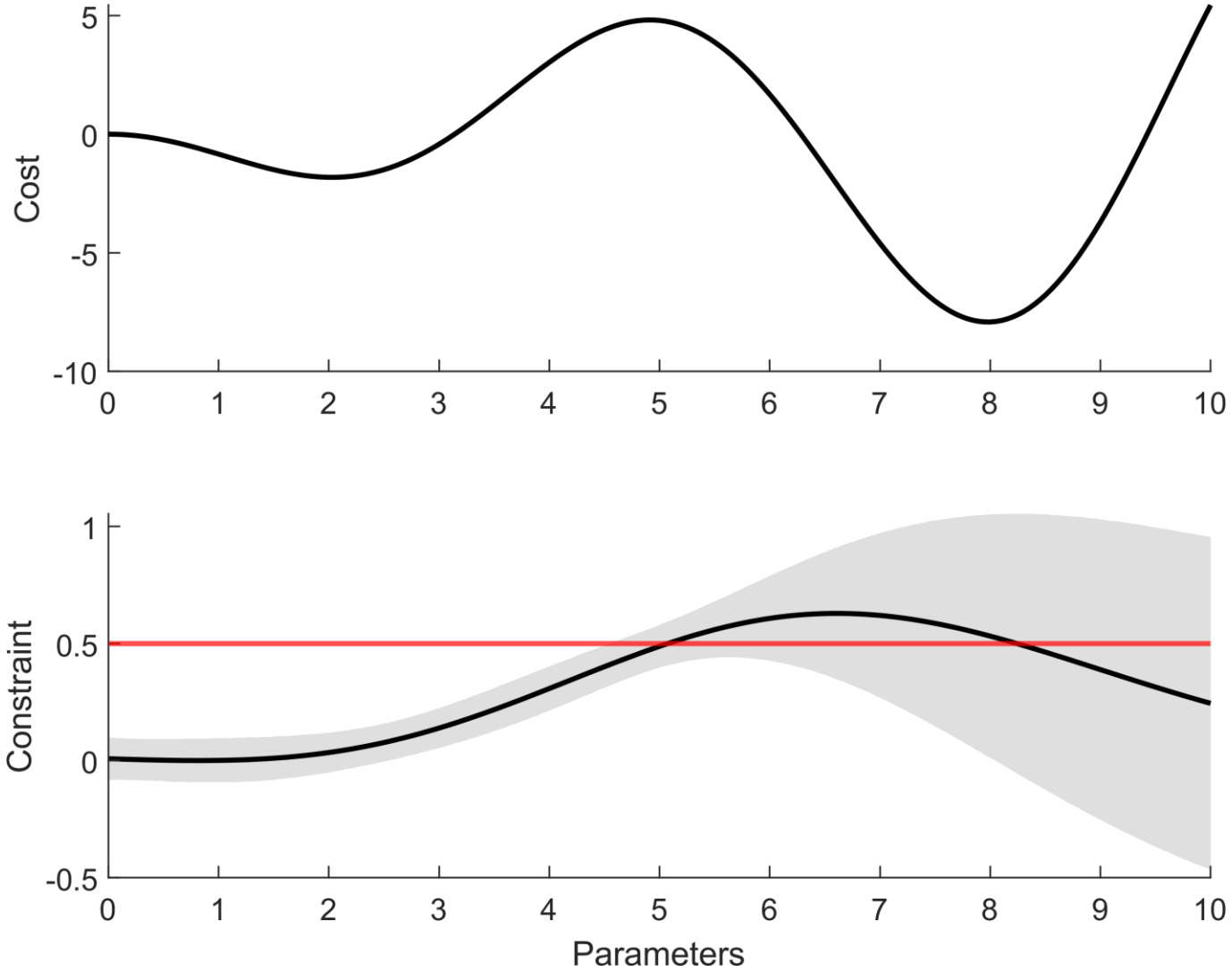
Hitting the Bull's Eye



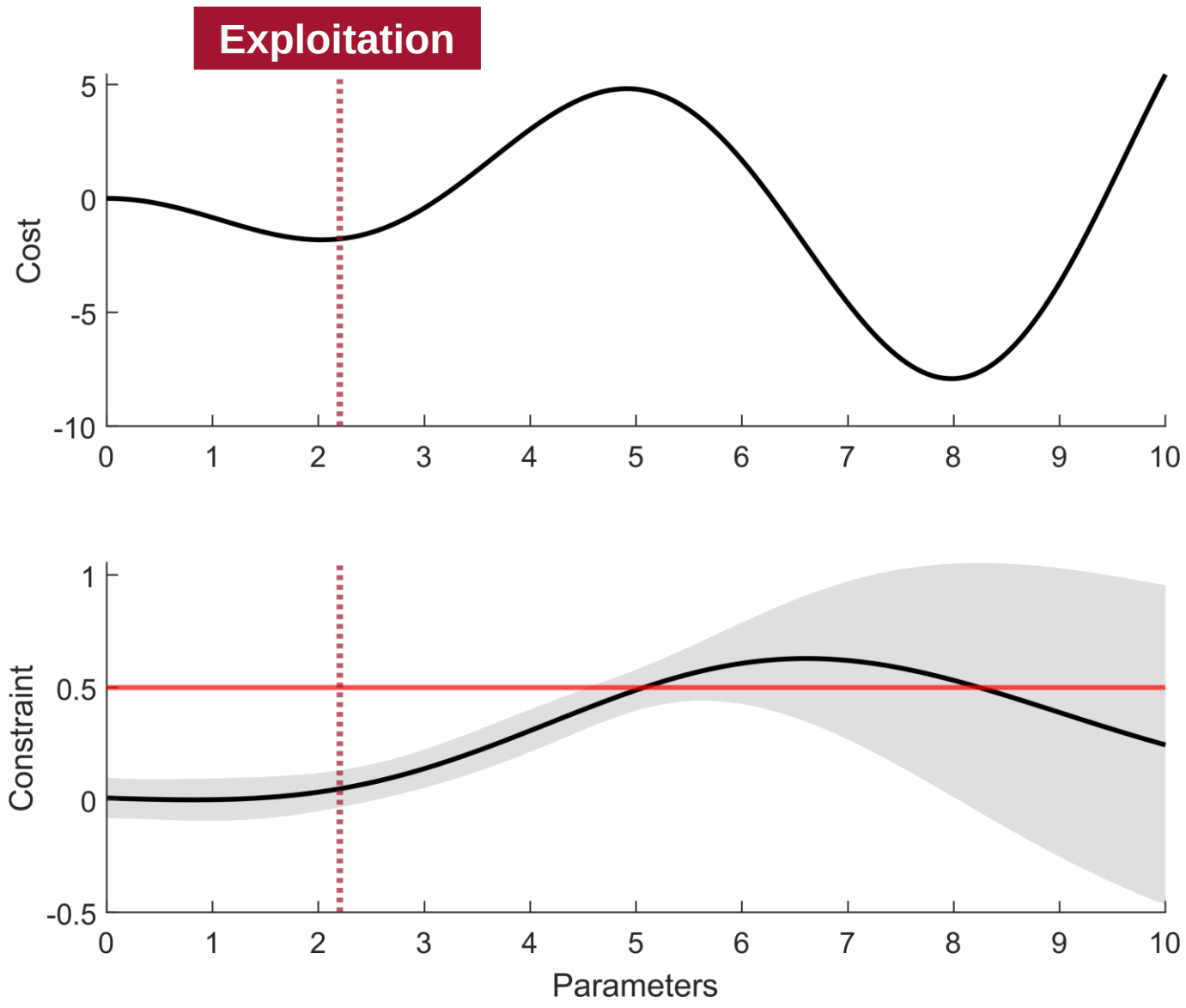


Source: UC Berkeley CS188 Intro to AI, Lecture Slides

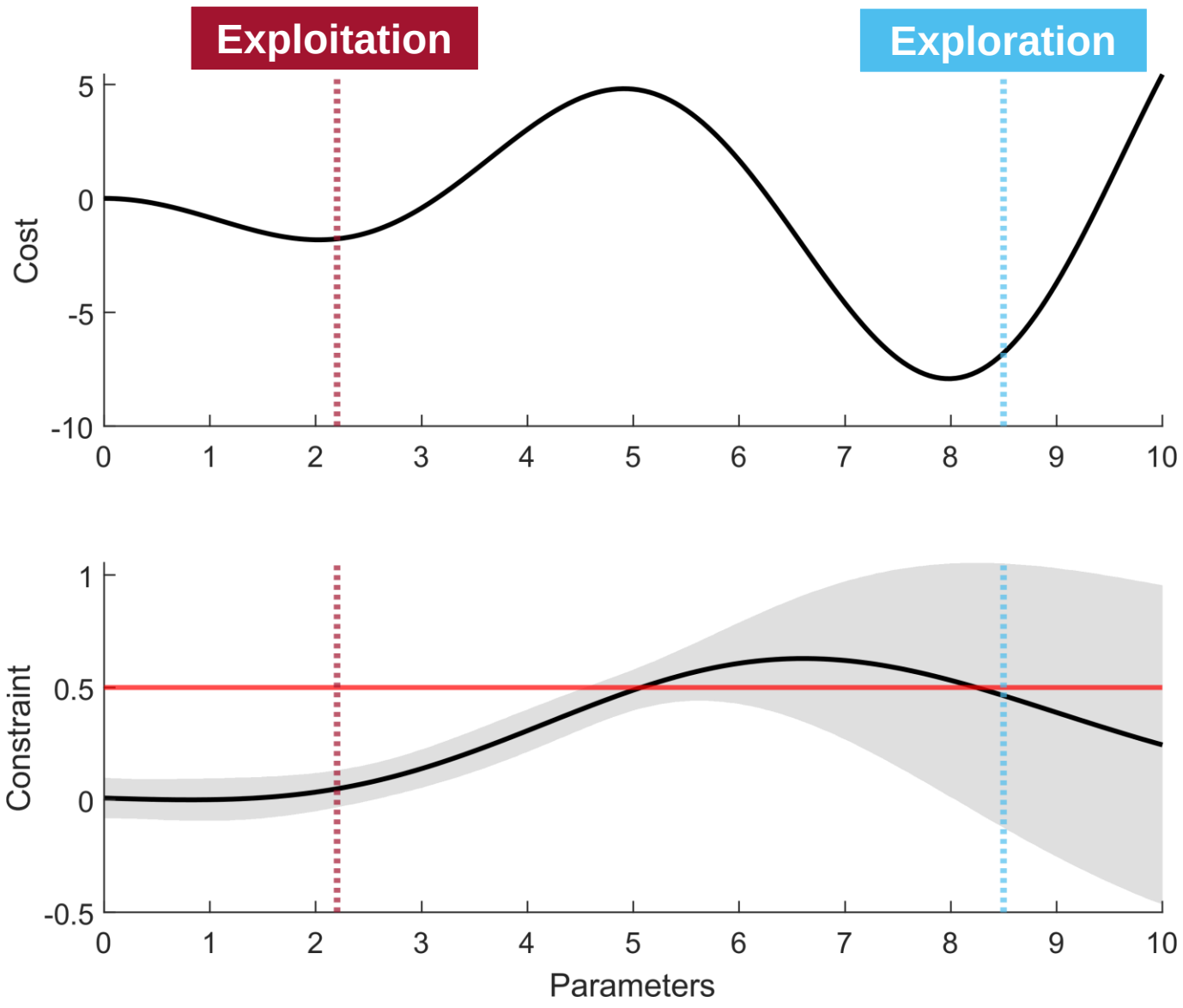
Exploitation vs. Exploration



A Cautious Choice

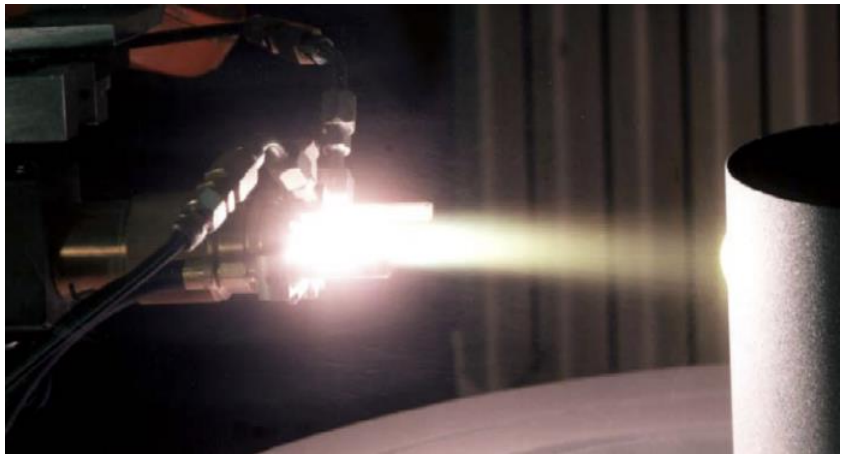


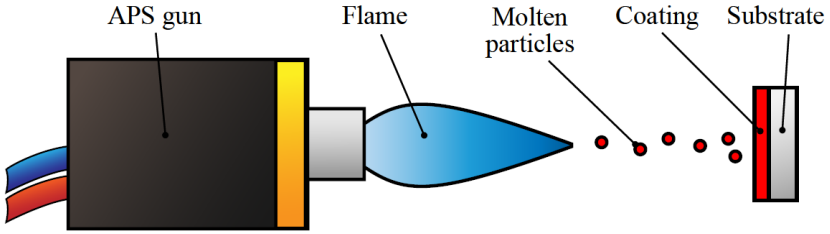
A Risky Choice



Atmospheric Plasma Spraying

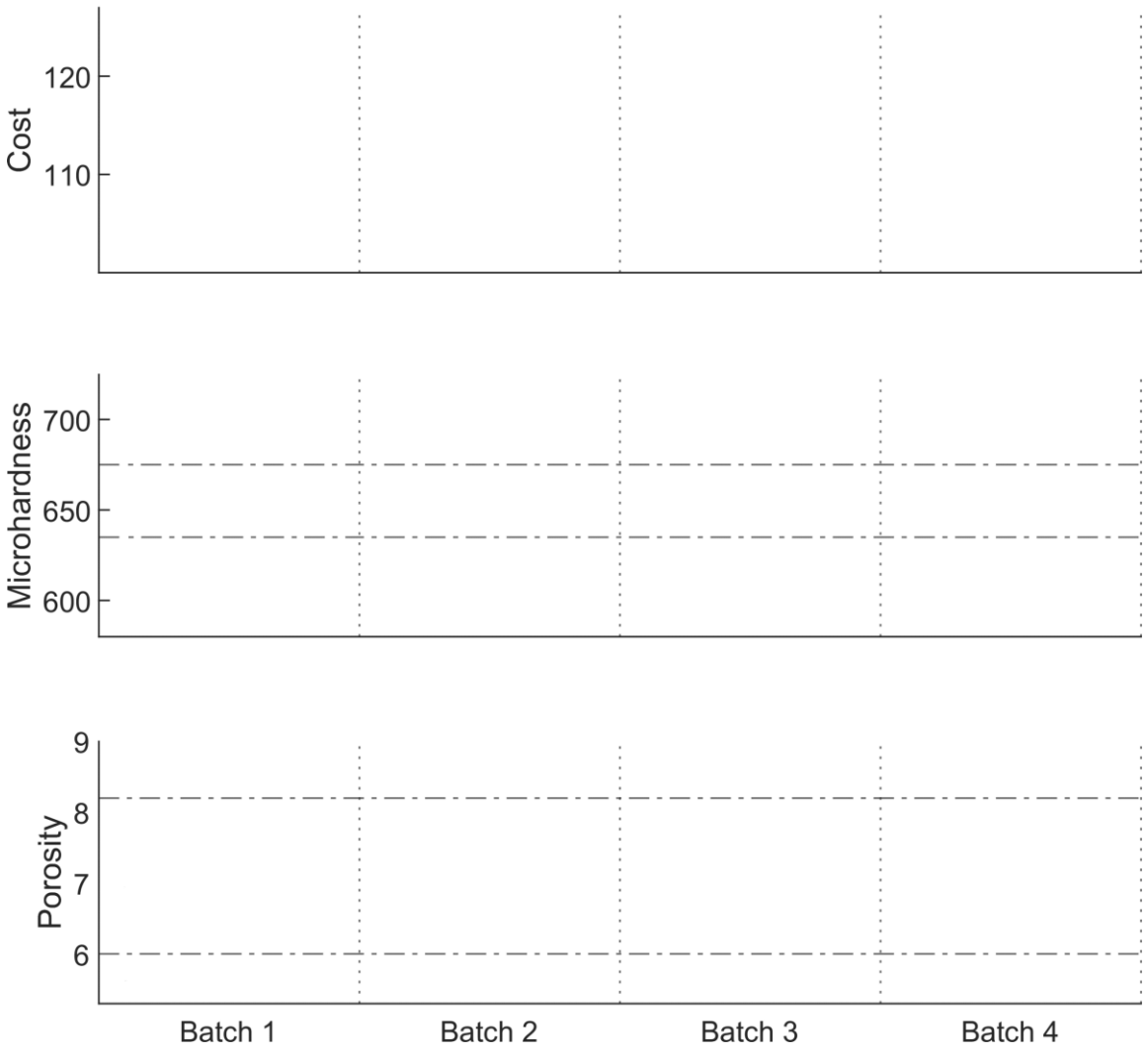
- Minimize the process cost
- Produce the desired coating





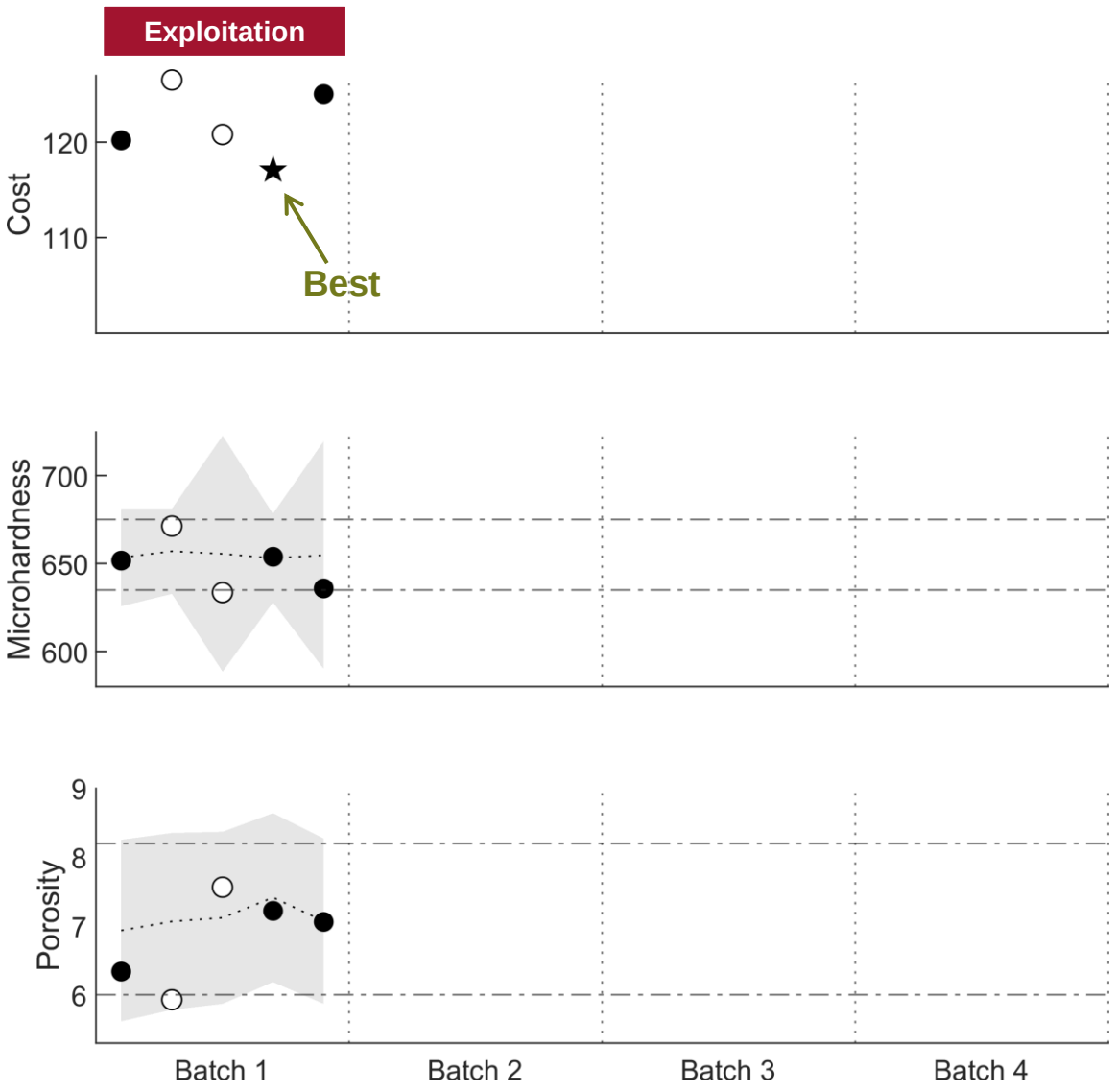
Results

- Minimize the process cost
- Produce the desired coating



Results

- Minimize the process cost
- Produce the desired coating



Results

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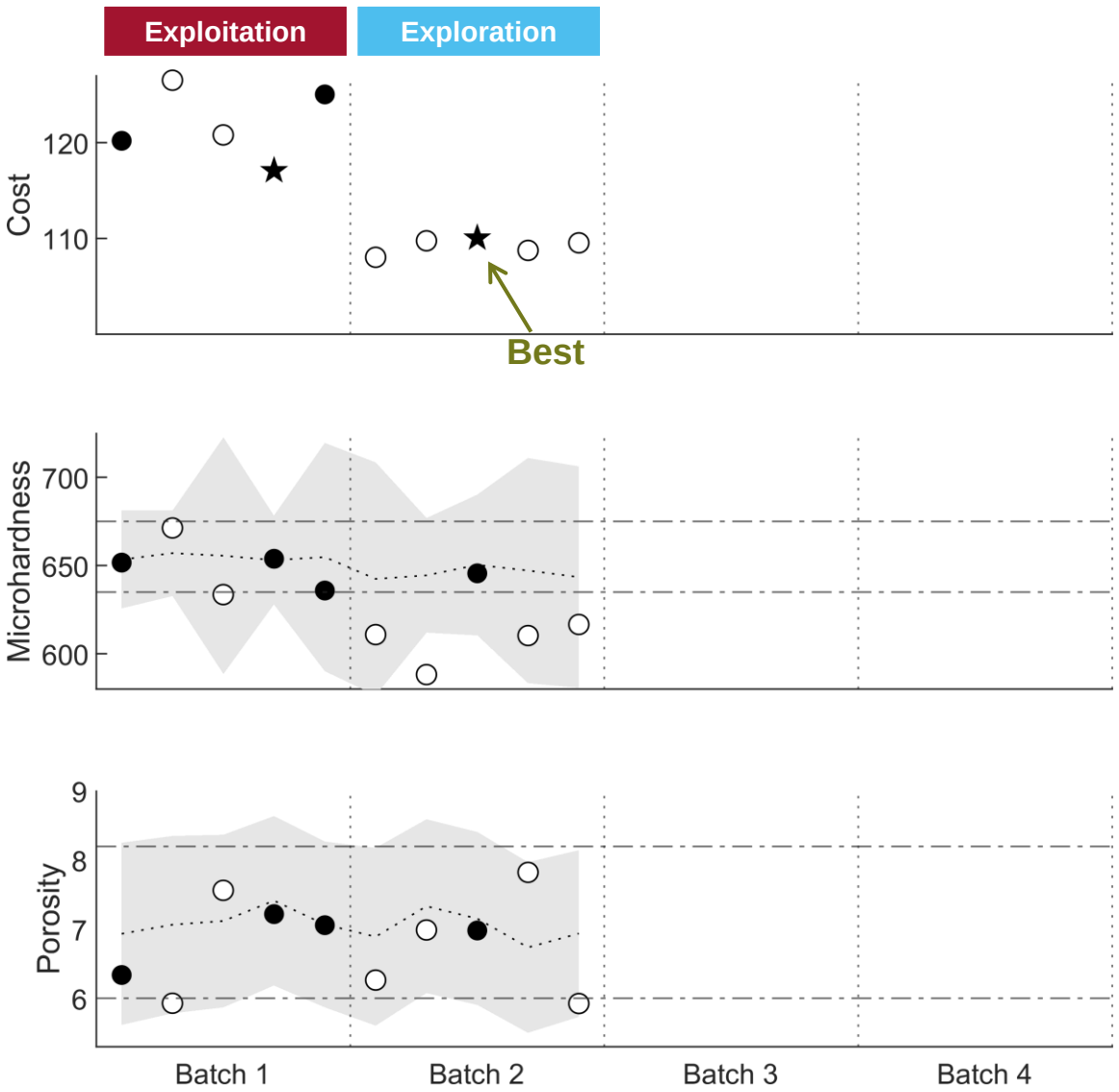
- Produce the desired coating



Results

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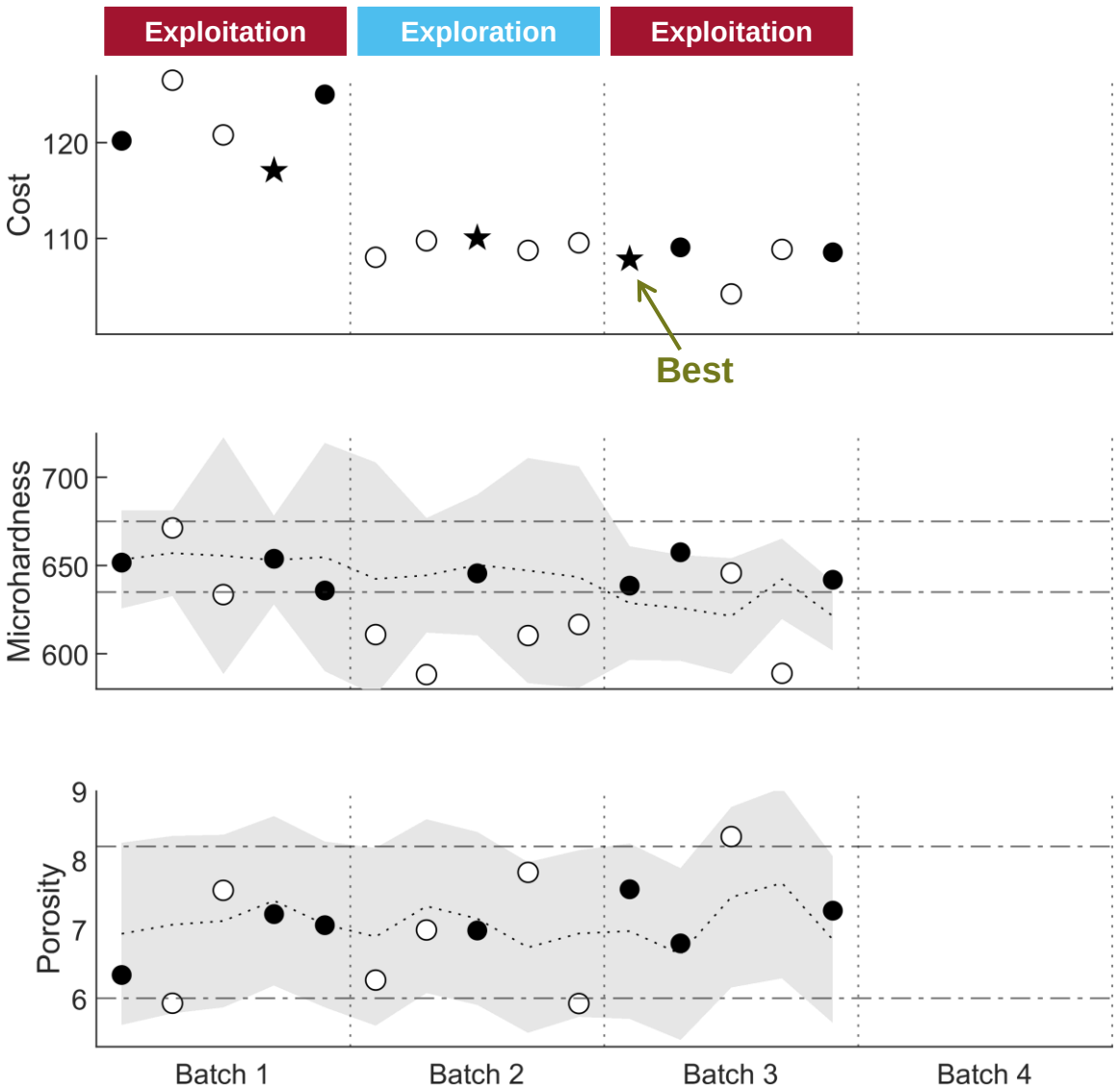
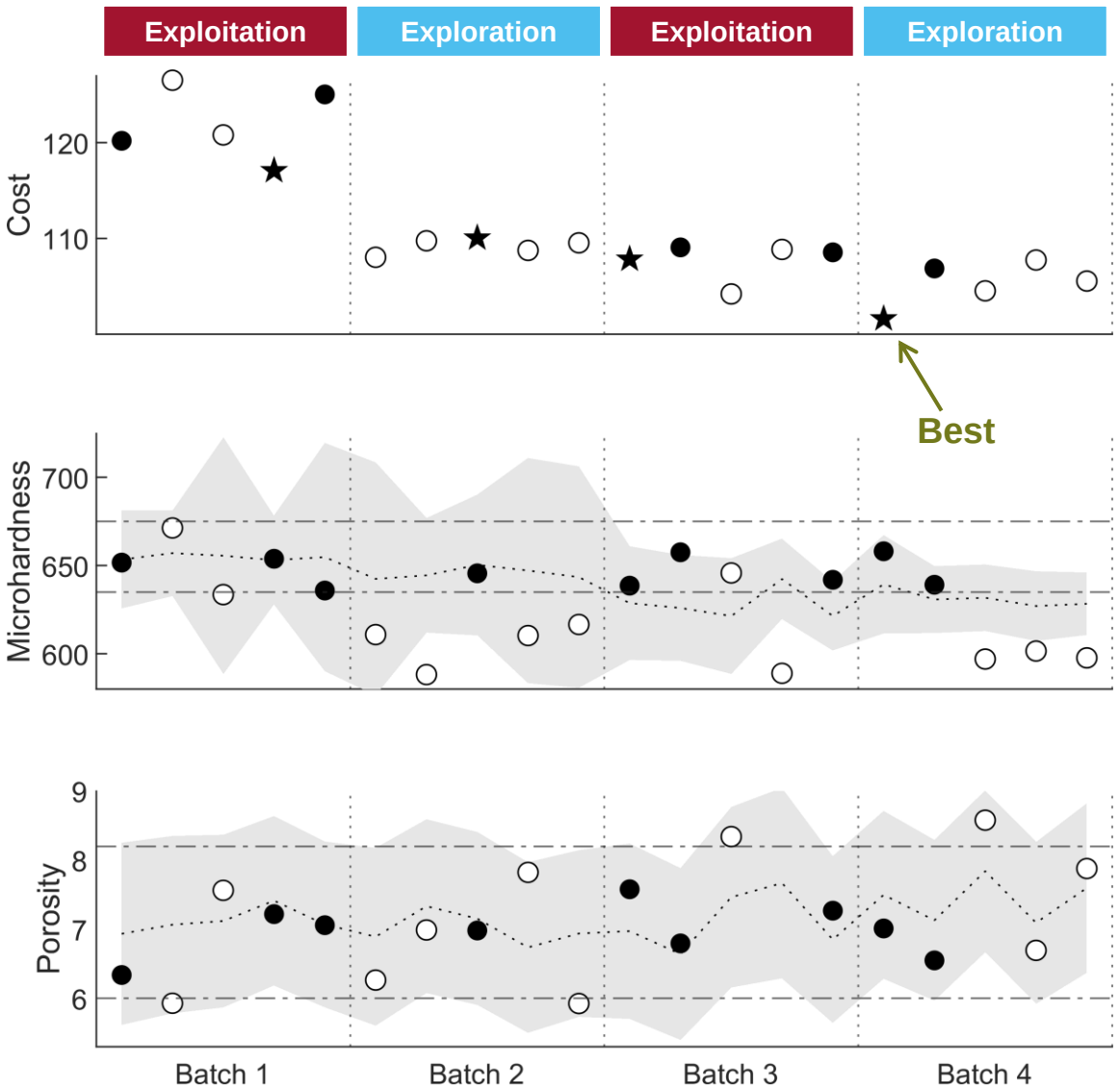


Results

- Minimize the process cost
- Produce the desired coating



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