

Case Study 3: The Trebuchet

BIOE 498/598 PJ

Spring 2021

Introduction

- ▶ **Objective:** Aim a trebuchet simulator to hit a specified distance.
- ▶ The trebuchet is aimed by adjusting three parameters:
 1. Fulcrum height
 2. Counterweight mass
 3. Sling length
- ▶ Each team will receive 12 training runs to build a model that predicts the optimal trebuchet settings.
- ▶ The average error for 8 testing runs will determine your group's final score.
- ▶ The simulator is stochastic — even if you find the optimal parameter settings, you will not hit the target exactly.
 - ▶ The stochasticity is controlled, i.e. each team will receive the same sequence of random deviates.
- ▶ You will have access to a demo simulator to refine your methods. The final simulator will use similar parameter ranges but will not behave identically.
- ▶ On **Monday, April 5**, the final simulator will open for 48 hours. Slides describing your strategy and results are due **Friday, April 9**.

Rules

1. Teams of 2–3 are allowed, but optional.
2. No sharing data across teams.
3. Your parameter settings must be derived from your model **for all testing runs**. No tweaking without guidance from the model!
4. You can use the demo simulator as many times as you want. Your group only has one chance with the final simulator.
5. Grading is based on your process, with bonus points for results.
6. Members of the winning team are allowed to claim “BIOE Trebuchet Champions 2021” on their CV/resume.