Jackson, MS, Public Schools JROTC STEM Competition and Field Day Outreach Project

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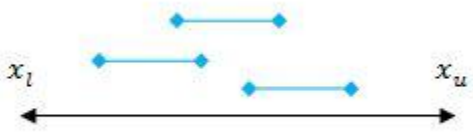
Research

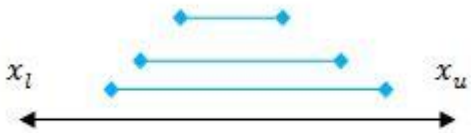
Bayesian Uncertainty Quantification and Non-deterministic Design Optimization

Bayesian Application to Evidence in Interval Form



Overlapping Intervals

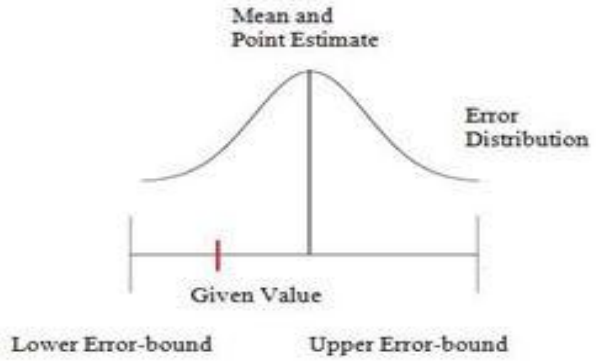
Disjoint Intervals



Nested Intervals

Bayesian probability:

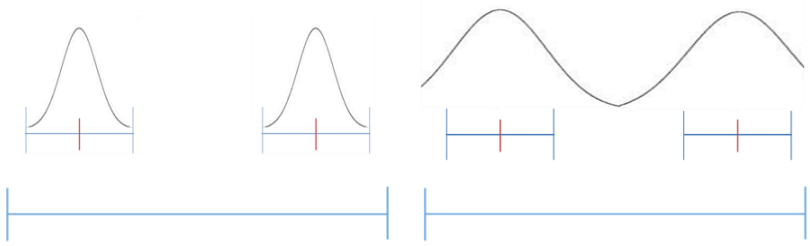
- Represents a state of knowledge.
- Updated with data.



Interval Reduction

Bayes' Rule:

$$f(H|E) = \frac{L(E|H)P(H)}{\int_{-\infty}^{\infty} L(E|H)P(H)dH}$$



Standard Deviation Adjustment

Outreach

Jackson Public Schools
Presentation
Project
Stem Experience Day

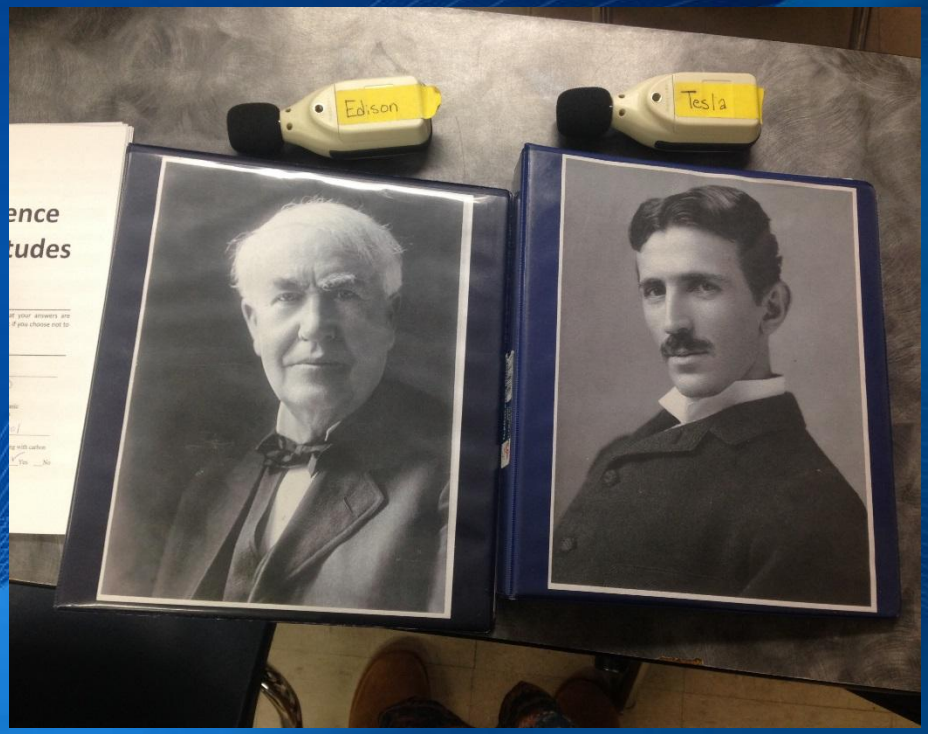
Jackson Public Schools

- Seven High Schools
  - 2012 Mississippi Achievement Report
    - Report Card: F F F D D C C
    - 31k students, 2k teachers
    - In STEM subjects Biology and Algebra 2.5% and 16% of students scored as advanced, respectively. 25% and 12% scored minimal
  - Demographics
    - 3 100% African American
    - Minority percentages: 99%, 97.9%, 97.35%, 94.7%
  - 5 year graduation rate of 65%
  - 80% of students live in poverty
- JROTC Program
- 1900 enrolled students
  - 99% graduation rate

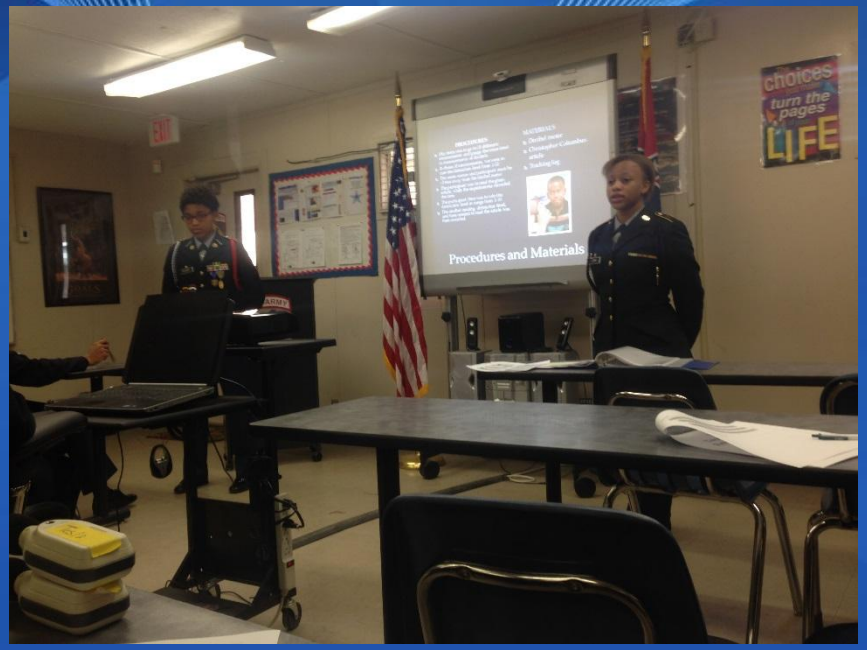
Presentation

The Project

- 10 Data Entries
  - Reading comprehension passage
  - Maximum decibel reading (minimum 5 feet)
  - Maximum sound duration
  - Time to complete passage
  - Distraction level (1 to 10)



Return of the Presentation



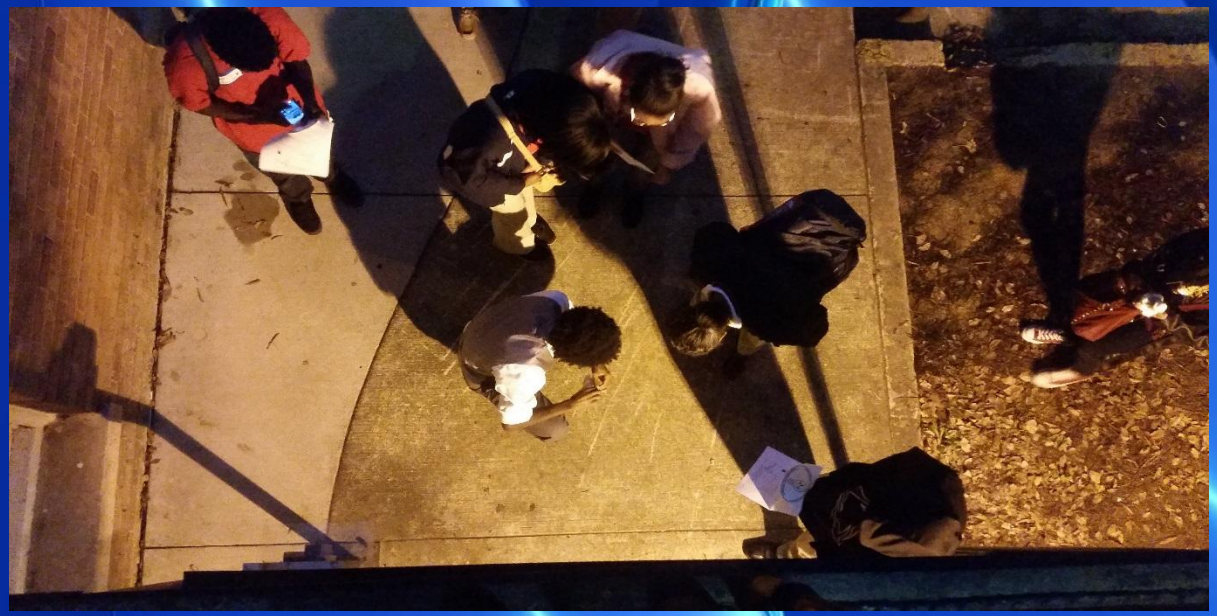
Winners and Participants

Stem Day: Facilities Tour

Patterson Labs:
Home of Mississippi State Space Cowboys Rocket Design Team

Stem Day: Speakers

Stem Day: Egg Drop



Stem Day: Golf Experience

Project Success

- Initial presentation attendance ~150 students
- Presentations from 18 groups
- 45 cadets attended STEM Experience Day