Bayesian Statistics
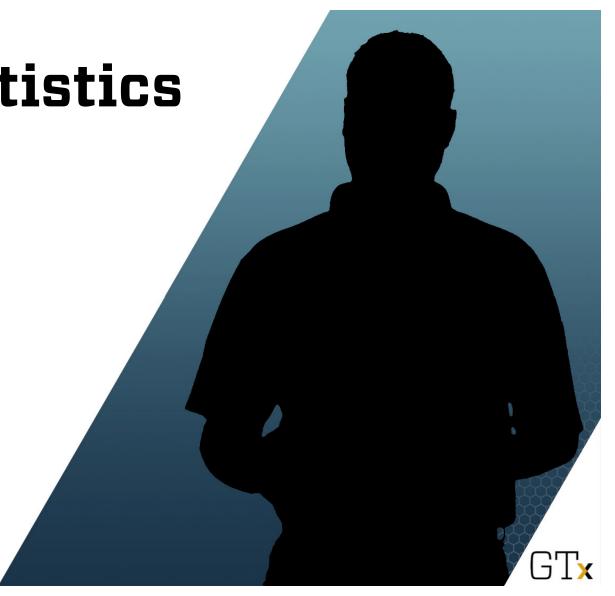## Historic Overview

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The Reverend Thomas Bayes

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Before We Begin...

The Reverend Thomas Bayes

- Born in 1701 or 1702
- Son of Joshua Bayes, Presbyterian minister
- In 1719 enrolled Edinburgh University to study logic and theology
- Nonconformist minister in Turnbridge Wells (Kent)
- Died in 1761, buried in Bunhill Fields, London
- Bayes' image first appeared in 1936 *History of Life Insurance* by Terence O'Donnell (page 335, no source given)

Thomas Bayes. (n.d.). *In Wikipedia*. Retrieved September 22, 2017, from https://en.wikipedia.org/wiki/Thomas_Bayes

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The Reverend Thomas Bayes

- Stephen M Stigler (Professor, Chicago University) conducts extensive research in history of statistics including Bayesian
- During his lifetime, Bayes published two works:
    - One in Divinity
    - The second in mathematics:
        - *Principal End of the Divine Providence and Government Is the Happiness of His Creatures* (1731) and
        - *An Introduction to the Doctrine of Fluxions* (1736)
- Elected member of Royal Society (1742)

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Summary

Bayesian Statistics
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The Essay

Before We Begin...

The Essay

Bayes' Essay

- *An Essay toward solving a Problem in the Doctrine of Chances*
- Communicated 23 December 1763 to Royal Society by Richard Price
- Richard Price found it in Bayes papers and wrote Intro and Appendix
- Bayes tried to give answer to a question not solved by De Moivre (1738) *Doctrine of Chances*
- Approach of Bayes was geometric rather than analytic
- No impact until Laplace's rediscovery (in more formal and complete form) of inverse probabilities around mid 1770's

The Essay

PROBLEM.

Given the number of times in which an unknown event has happened and failed: *Required* the chance that the probability of its happening in a single trial lies somewhere between any two degrees of probability that can be named.

Summary