

# Bayesian Statistics

## Bayes Rule

$$P(A \& B) = P(A|B)P(B) = \text{Likelihood} \times \text{Prior}$$

$$P(B|A) = \frac{P(A \& B)}{P(B)} = \frac{P(A|B)P(B)}{P(B)}$$

$\downarrow$  Posterior  $\downarrow$  Evidence

$$P(\text{disease} | \text{test } (+)) = \frac{P(\text{disease} \& \text{test } (+))}{P(\text{test } (+))} \rightarrow \text{people with disease and were tested } (+)$$

$$= \frac{P(\text{test } (+) | \text{disease}) P(\text{disease})}{P(\text{test } (+))}$$

