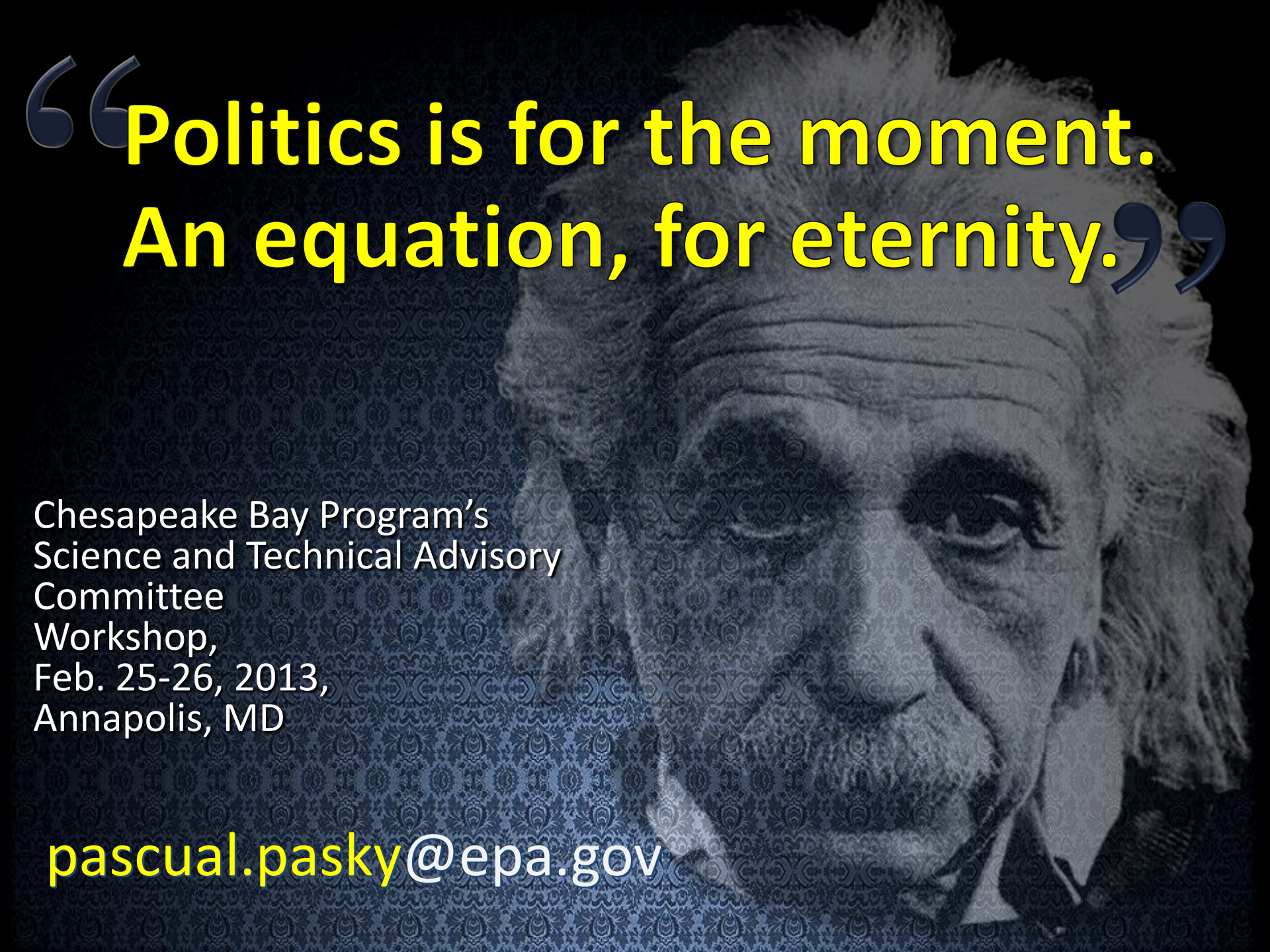
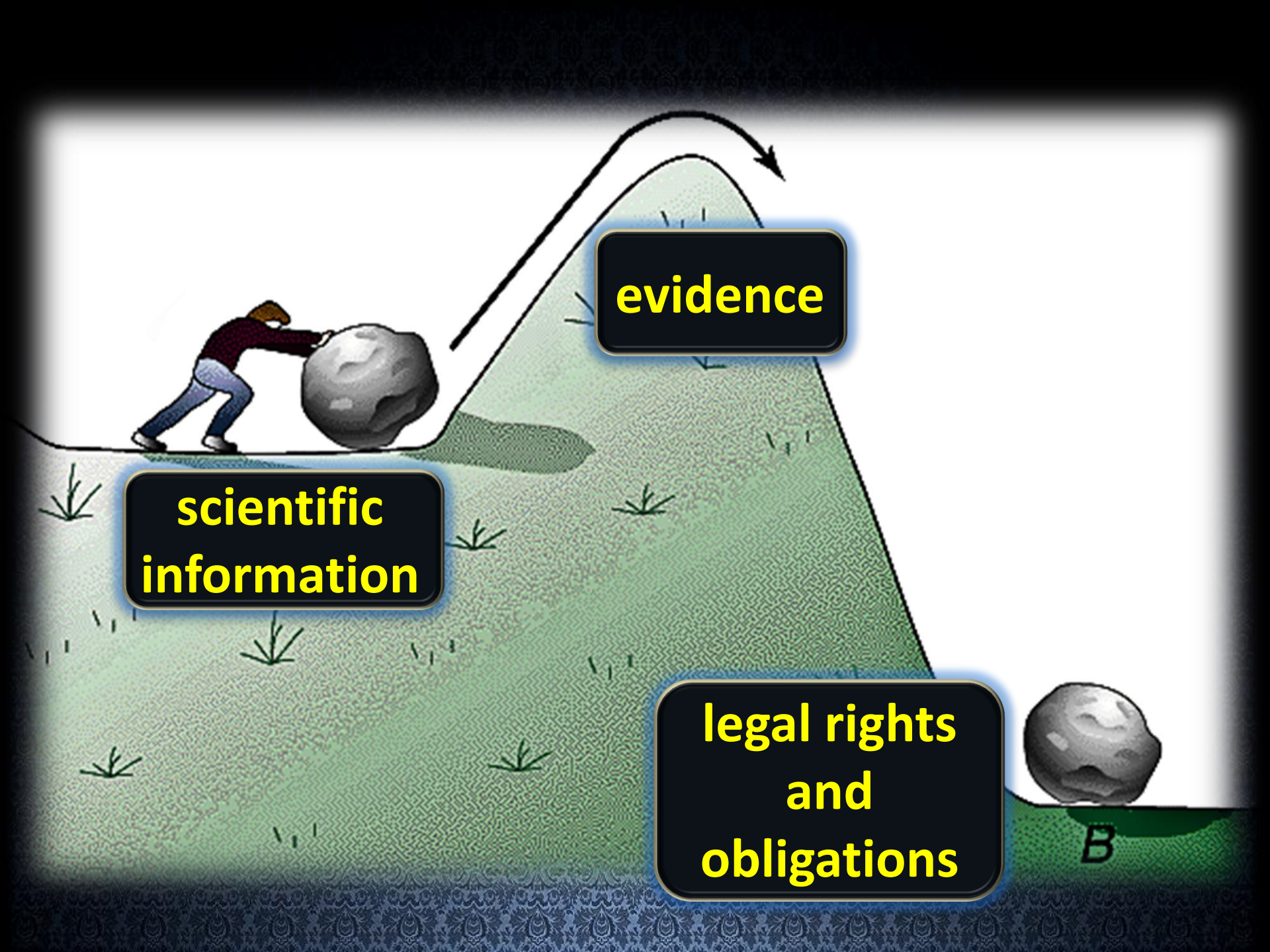


Chesapeake Bay Program’s
Science and Technical Advisory Committee
Workshop,
Feb. 25-26, 2013,
Annapolis, MD

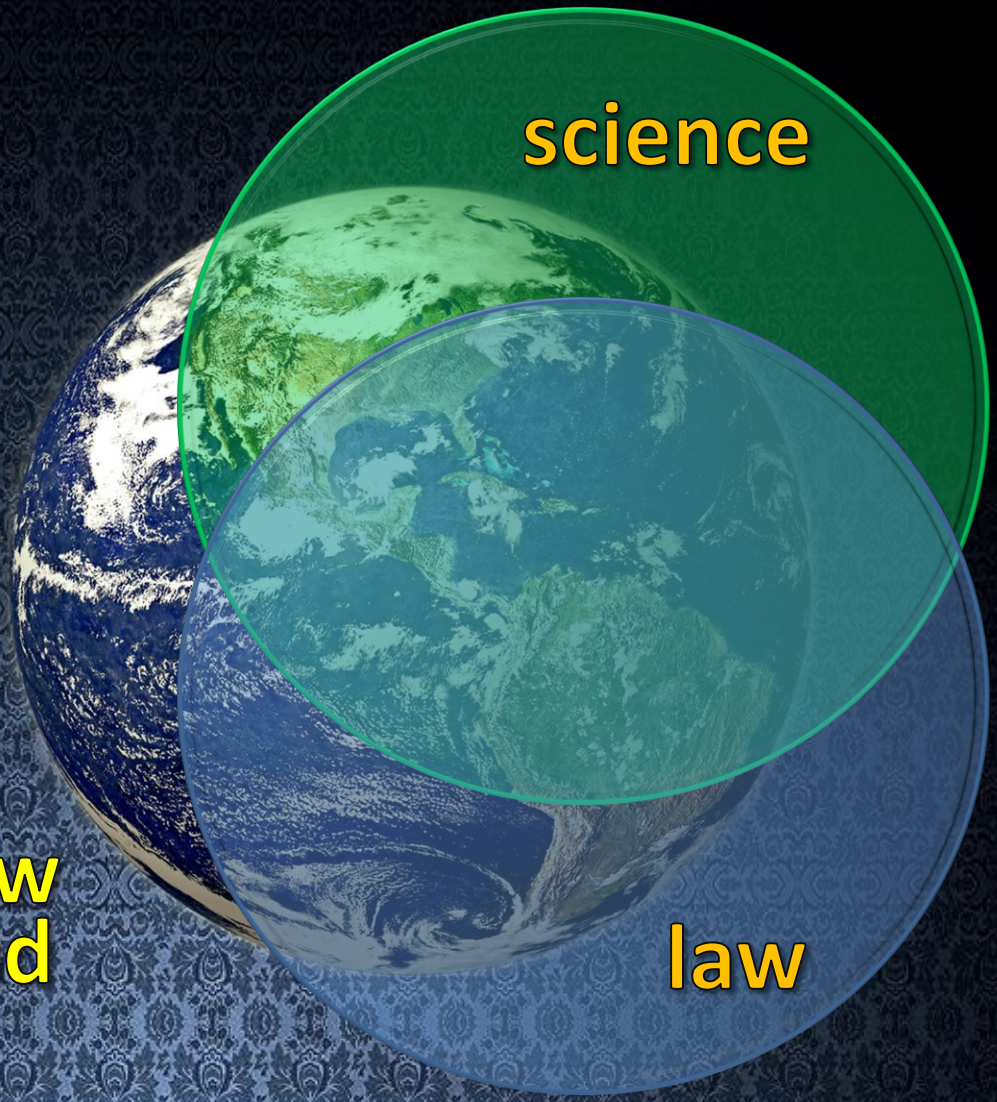
pascual.pasky@epa.gov


evidence
scientific information
legal rights and obligations
B

Premises:

1. Known and unknown unknowns are inevitable

2. Concilience between science and law is desirable and possible.



Jurisprudence on regulatory models

f (data, parameters)

- If rational connection between model and reality, courts defer to Agency.

f (data, parameters)

f (data, parameters)

- Does difference matter?
- Are methods compatible?

data

- Work with available data, then adapt.

f (•)

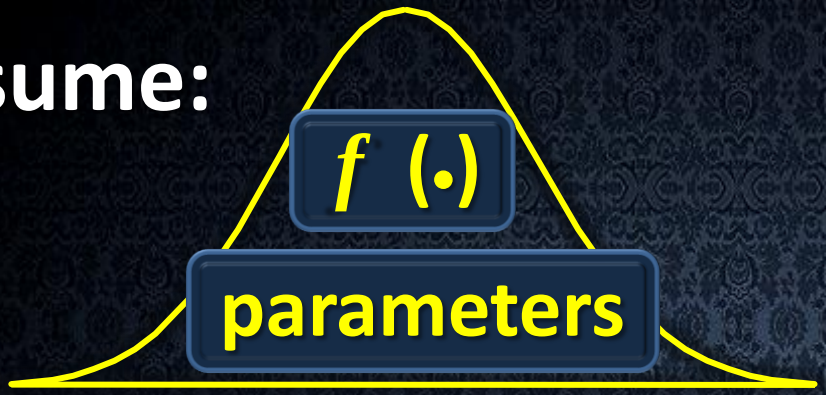
parameters

- Irrational if based on implausible assumptions.


MA
v.
EPA
Scientific evidence can compel EPA to regulate CO_2
Petitioners can't link coastal harms back thru web of causal factors to the fraction of global emissions that EPA would limit.

Defining causation

assume:

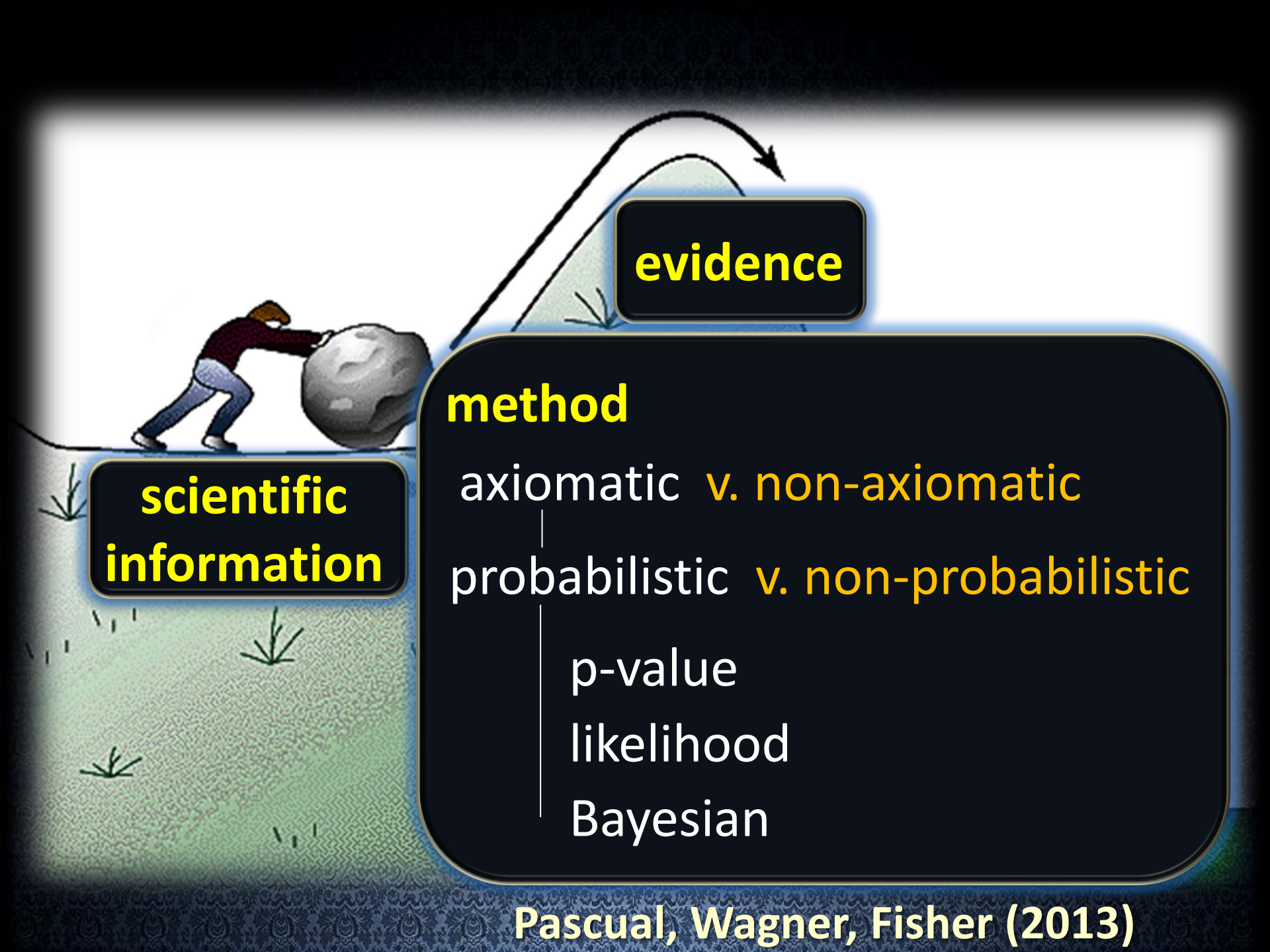


given:

data

infer:

$f(X, \theta) \rightarrow Y$


evidence
scientific information
method
axiomatic v. non-axiomatic
probabilistic v. non-probabilistic
p-value
likelihood
Bayesian
Pascual, Wagner, Fisher (2013)

Defining causation

assume:

$f(\cdot)$

parameters

given:

data

infer:

$f(X, \theta) \rightarrow Y$

assume:

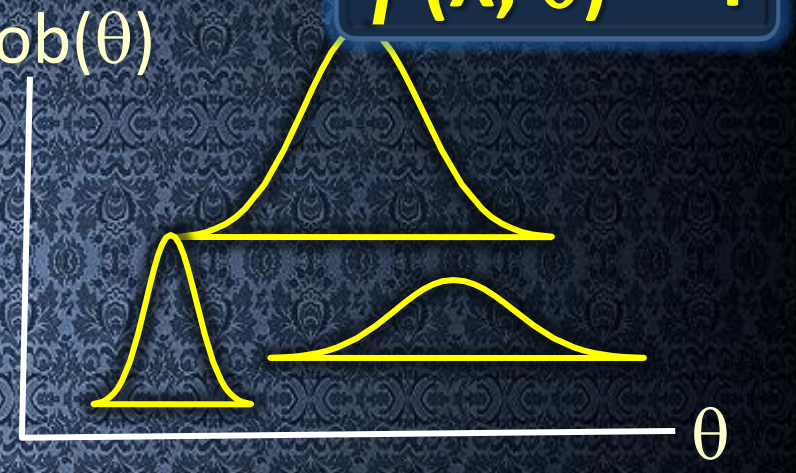
$f(\cdot)$

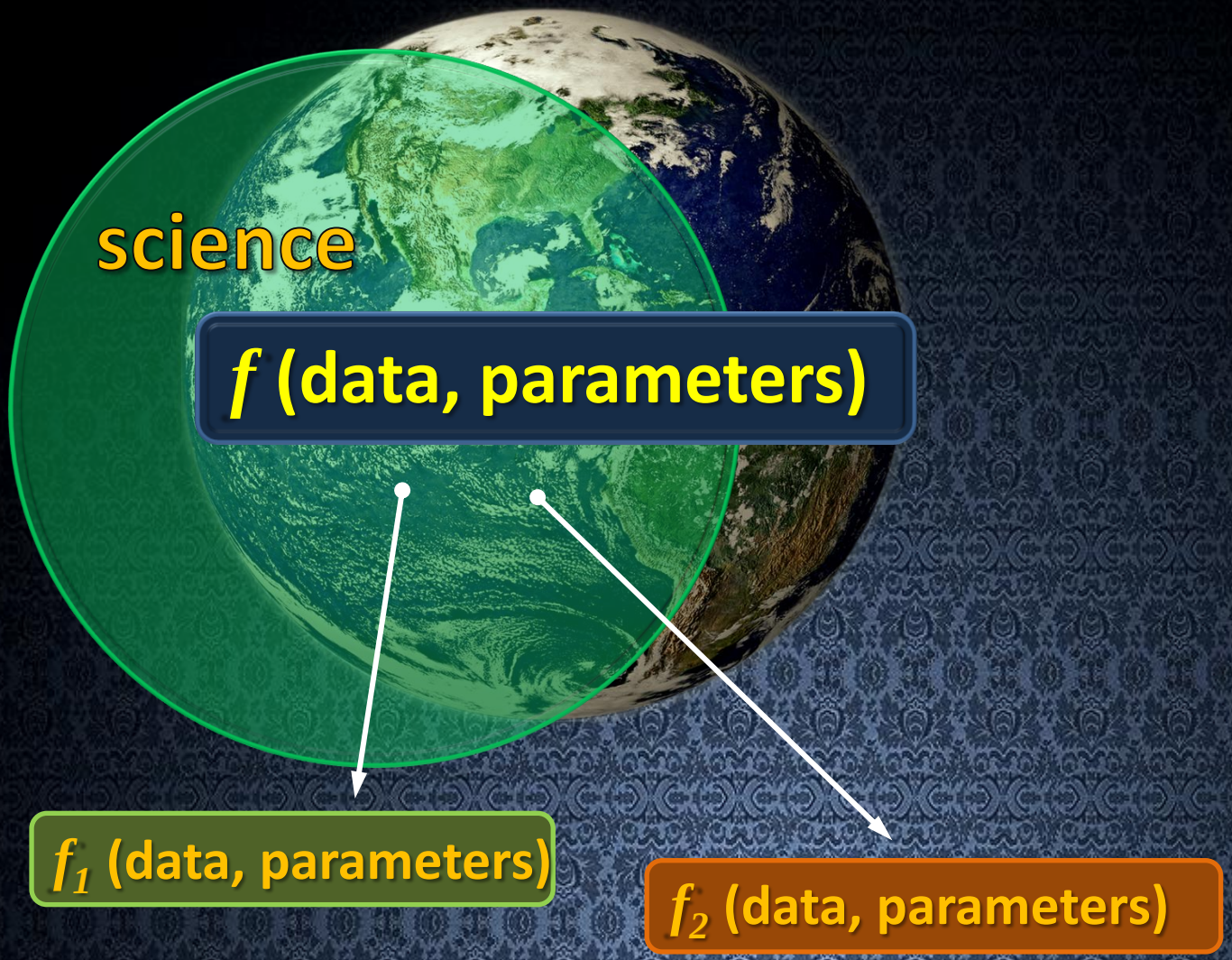
given:

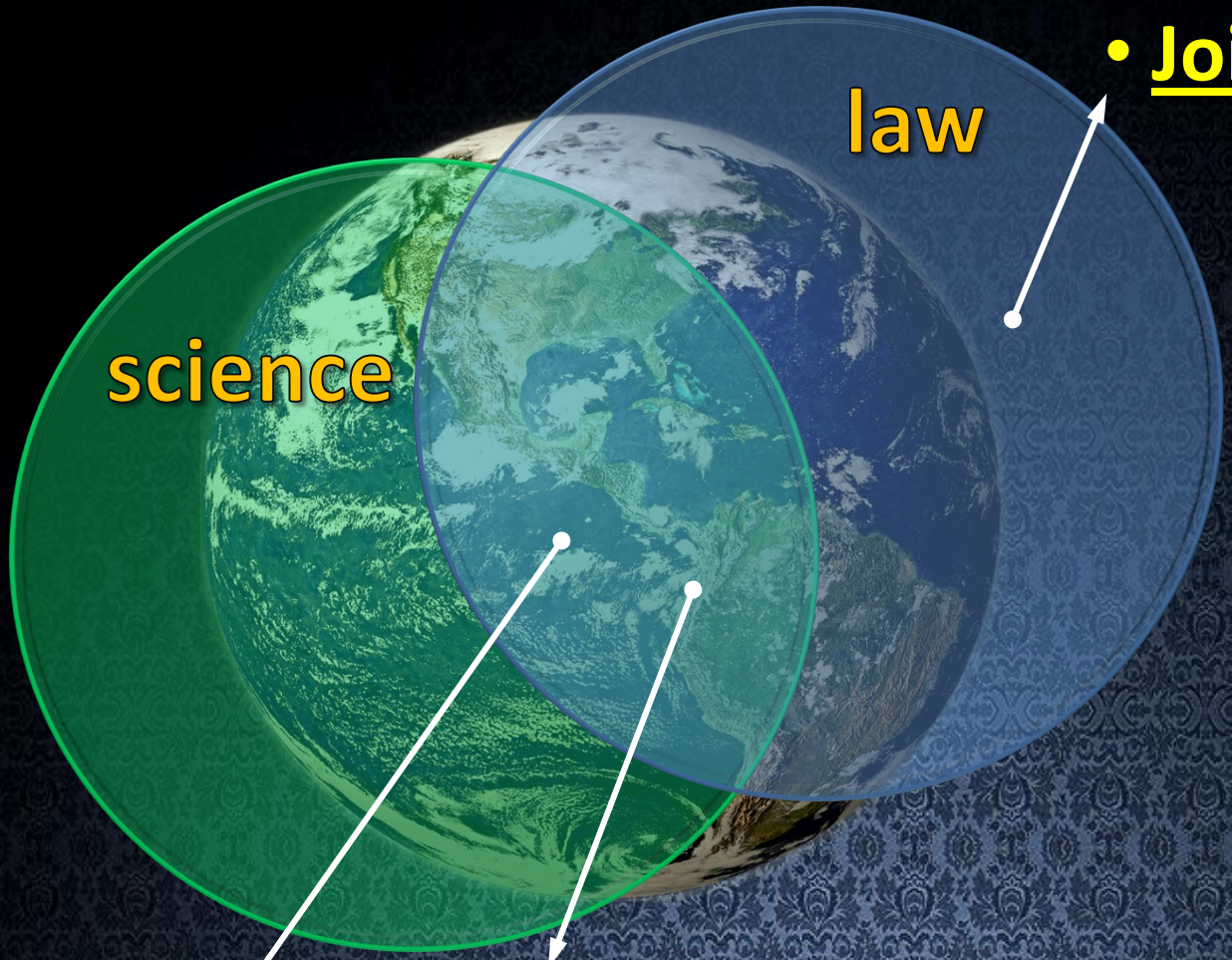
data

infer:

$f(X, \theta) \rightarrow Y$



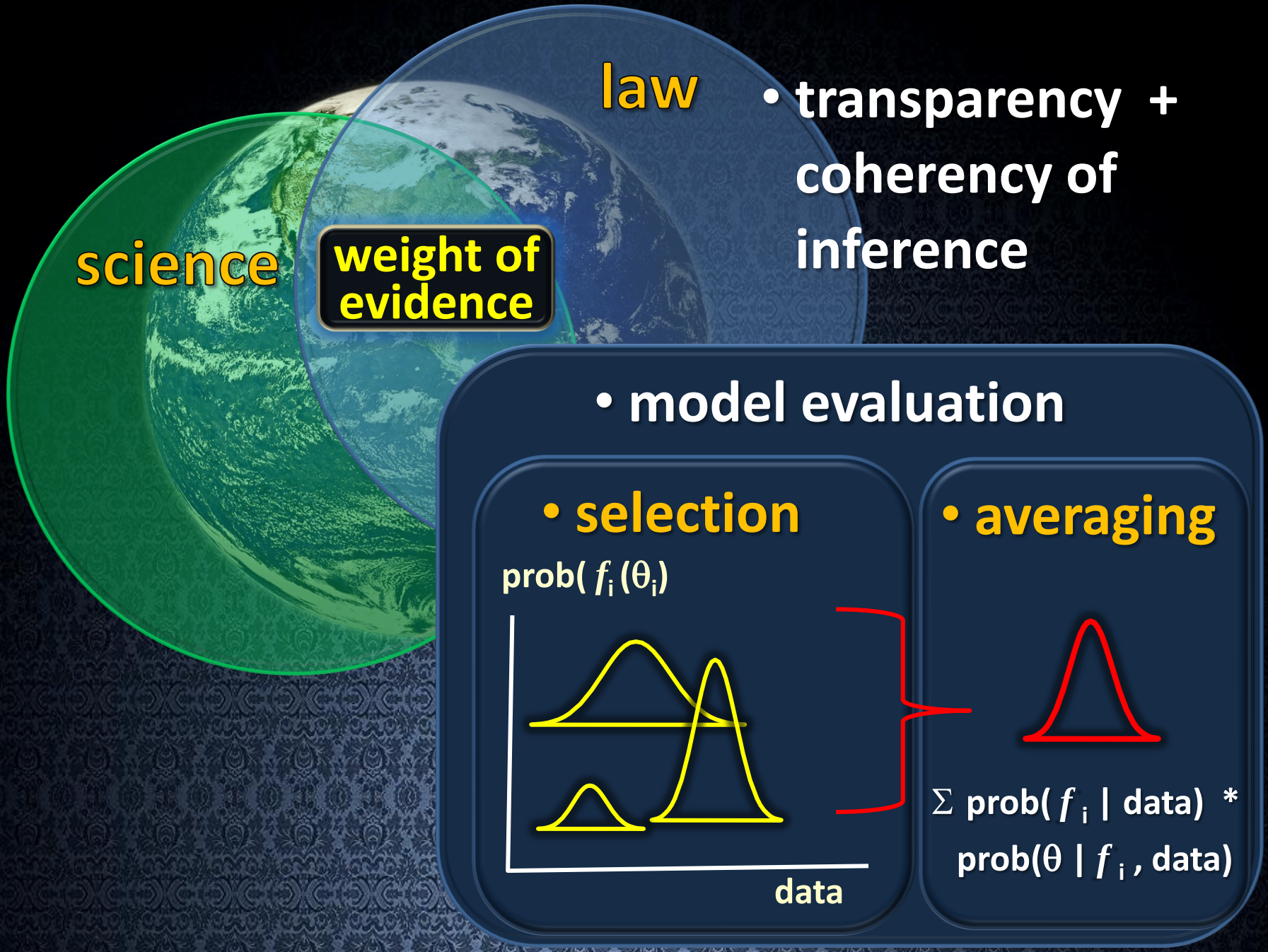

science
f (data, parameters)
f1 (data, parameters)
f2 (data, parameters)



- **Joiner (S.Ct. '97)**
  Discrete evidence, not WOE.

- **Milward (Ct.App. '11)**
  Pluralistic inferential methods.

- **Matrixx (S.Ct. '11)**
  Not just p-values.


law
science
weight of evidence
• transparency + coherency of inference
• model evaluation
• selection
prob(f_i (θ_i)
data
• averaging
Σ prob(f_i | data) * prob(θ | f_i , data)

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