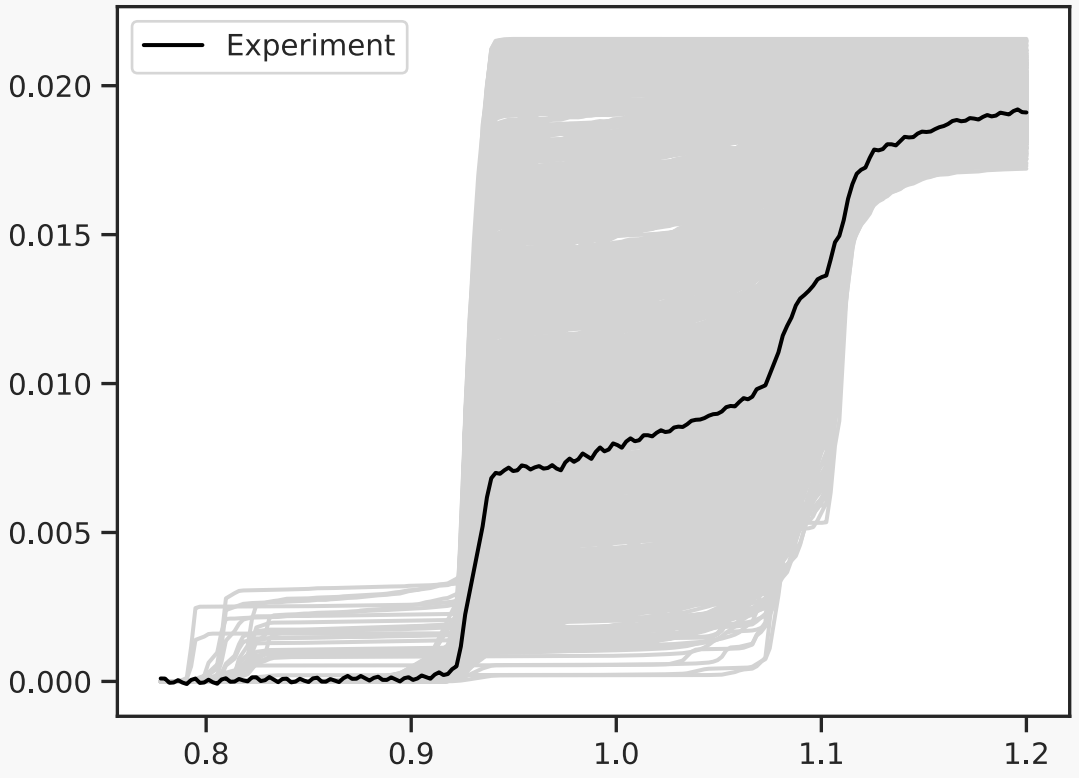
Bayesian Model Calibration



- We wish to calibrate a computer model with parameters θ to an experiment
- Can compute computer model (simulations) over wide range of θ
- The data is functional in nature and has phase and amplitude variability
- Utilize elastic metrics in a Bayesian Model Calibration Framework

Bayesian Model Calibration

- Let $z(t, \mathbf{x_i})$ denote an experimental measurement from the i^{th} experiment
- Similarly, let $y(t, \mathbf{x_i}, \mathbf{u})$ denote a simulation of the i^{th} experiment at the with input parameters $\mathbf{u}$
- An approach to Bayesian model calibration with functional response specifies

$$z(t, \mathbf{x_i}) = y(t, \mathbf{x_i}, \theta) + \delta(t, \mathbf{x_i}) + \epsilon_i(t, \mathbf{x_i}), \quad \epsilon(t, \mathbf{x_i}) \sim \mathcal{N}(0, \sigma_\epsilon^2)$$

- Where δ is model discrepancy term and ϵ represents all other error
- This model will suffer from the aforementioned problems with phase variability