1162-60-230 **James L Carroll***, jlcarroll@lanl.gov. *Hierarchical Bayesian Models for Radiographic Uncertainty Quantification.* Preliminary report.

Uncertainty estimation is an essential problem in many fields. For complex non-linear inverse problems, traditional uncertainty propagation can be difficult. Even when it is possible, the presence of unknown unknowns can further complicate the issue. For radiography, one possible approach is to perform the inverse of an image of a known object. The error from the known truth can then be considered a sample from the uncertainty distribution.

DARHT radiography of known static objects is expensive and rare. Therefore each experiment is rarely repeated exactly. The available data varies in machine tune, object thickness, endpoint energies, camera settings, the presence or absence of exit windows, phosphors, etc. and in many other details of fielding.

We propose that the best way to deal with uncertainty quantification from such rare, sparse data is with a Bayesian Hierarchical model that can use wide Bayesian priors to inform uncertainty where data is sparse, and can borrow support from more well attested regions of the domain to help fill in the gaps for other, less well attested regions of the domain. This approach has the advantage of illuminating the portions of the domain that would benefit most from additional testing using the Expected Value of Sample Information (EVSI). (Received September 01, 2020)