

CUQIpy: A new Python platform for computational uncertainty quantification in inverse problems

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Abstract

In this talk we present CUQIpy (pronounced "cookie pie") – a new computational modelling environment in Python that uses uncertainty quantification (UQ) to access and quantify the uncertainties in solutions to inverse problems. The overall goal of the software package is to allow both expert and non-expert (without deep knowledge of statistics and UQ) users to perform UQ related analysis of their inverse problem. To achieve this goal the package utilizes state-of-the-art tools and methods in statistics and scientific computing specifically tuned to the ill-posed and often large-scale nature of inverse problems to make UQ feasible.

We showcase the software on problems relevant to imaging science such as computed tomography and partial differential equation-based inverse problems.

CUQIpy is developed as part of the CUQI project at the Technical University of Denmark (DTU) and is available at <https://github.com/CUQI-DTU/CUQIpy>.