

Making better decisions in the face of uncertainty in Digital Agriculture: The Uncertainty Toolbox

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Digiscape is one of 8 Future Science Platforms in CSIRO that is focussed on delivering new analytics in the digital age to better inform agricultural systems and processes in the face of uncertainty. Traditional modelling approaches for decision-makers have largely ignored uncertainty, ignored spatio-temporal dependencies and have difficulty integrating different types of data that results in communications and decisions that are not easily accepted or adopted.

The Uncertainty Toolbox is one of 15 projects within Digiscape trying to make a difference to the way models are used, reported and communicated in practice for decision-making. Uncertainty is front and centre of every modelling problem but it is sometimes difficult to quantify and it is challenging to communicate. In this presentation I will provide an overview of Digiscape and the Uncertainty Toolbox and the components of the toolbox that we are developing for modellers. The toolbox will house a number of workflows that include sensitivity analysis, design of computer experiments, model emulation, prediction and forecasting, Bayesian Hierarchical Modelling using STAN, model and data interoperability and visualisation. I will touch on a few of these workflows in the presentation and describe the methods we are developing for each and how we plan to link in with the Digiscape application projects through a software platform “Conflux”, to facilitate better decision-making.