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## The Snake In The MeqTree: Using Python For Simulation And Calibration Of Radioastronomical Observations

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Calibration of observational data from the next generation of radio telescopes presents a number of unique challenges, not only in terms of pure computational volume, but also in terms of managing complexity. In general, the calibration process involves constructing a combined model of the instrument and the observed sky, and fitting that model to the observations. Due to the great variety of sky sources and instruments, specific models can be very elaborate, but also very different from each other.

The MeqTree package attempts to address this problem by providing a very flexible model construction & fitting toolkit which, in principle, should be applicable to all existing and future instruments. Using MeqTrees, inscrutably complicated and detailed models ("trees") may be constructed. Python plays two critical roles in taming that complexity:

- TDL (Tree Definition Language), which is the language used to build up our models, is underpinned by Python. TDL allows for very rapid development of trees for simulation and calibration.
- The MeqBrowser, written completely in Python/PyQt, is a graphical browser for running, examining and debugging the trees.

The talk will provide a brief overview of radio interferometry, describe the calibration and simulation problems we face, and show how Python has enabled some crucial breakthroughs in the process.

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