Extracting science from the LSST data stream requires a detailed knowledge of the properties of the LSST catalogs and images (from the detection limits to the accuracy of the calibrations to how well galaxy shapes can be characterized). These properties will depend on many different aspects of the LSST including the design of the telescope, the conditions under which the data are taken and the overall survey strategy. To prepare the data and science analysis systems for the LSST data stream, the LSST Image Simulation group is undertaking the development of an LSST simulation framework. This consists of galaxy, stellar and solar system catalogs designed to match the depth of the LSST (to r=28), and high fidelity image simulations that trace photons through the atmosphere and telescope to the detector. We describe here the progress towards the development of this end-to-end simulation system.

The simulation framework for the LSST is designed to provide high fidelity simulations of the entire LSST optical system (from above the atmosphere to the camera output). Combined with the Operations Simulator these catalog and image simulations are used as inputs for a series of Data Challenges. These Challenges drive the development of the LSST reduction and analysis pipelines - including the development of algorithms for the co-addition and subtraction of images, the detection of variable and moving sources and the classification of transient events. Through the continued development of this framework the LSST Image Simulator will validate the design of the survey and the sensitivity of the science to statistical and systematic effects.

References: