Title: Delivering Transformational Science with the new generation of radio telescopes

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Abstract: The new generation of radio telescopes from the EVLA to the SKA and its precursors will provide a massive advance in radio astronomy with eventually two orders of magnitude improvement in sensitivity and an ability to map the sky up to a million times faster than any current telescope. This will enable some key problems in cosmology and astrophysics to be addressed including following the evolution of neutral hydrogen, the raw material for formation of stars and planetary systems, and the use of pulsars to test gravity and detect long-wavelength gravitational waves.

These advances not only require significant hardware technical advances, they also pose very substantial data processing problems especially for imaging. The very large datasets and the need for very high dynamic-range, high fidelity imaging, mean a shift from the current imaging approaches. In this talk I will briefly introduce the scientific challenges and explain the requirements on the imaging problem. I will then discuss in more detail the imaging problem, how it scales to the new generation of instruments where algorithmic advances are likely to be needed and the computational cost and how it might be delivered.