PHYSICS AND ASTRONOMY
COLLOQUIUM

David W. Hogg, Ph.D.
New York University

The Astronomer's Theory of Everything

Enormous projects in astronomy are creating enormous data sets and creating enormous data analysis challenges; indeed there are several areas of astrophysics in which we can think about truly comprehensive data sets that could, for example, measure the amplitude of every large-scale structure mode (above some scale) in the visible Universe, or the position and velocity of every star (above some luminosity) in the Milky Way. These enormous data sets bring enormous data-analysis challenges. I argue that causal, generative, probabilistic models provide the most precise and accurate methods for moving information from the observations to the physical quantities of interest. Eventually, these probabilistic models will (or ought to) merge into an enormous "theory of everything" with astounding numbers of nuisance parameters. I discuss our path to this singularity with examples of non-trivial data analyses in areas of the Solar System, exoplanets, and cosmology.

THURSDAY, SEPTEMBER 19, 2013 | 4:00 PM | HAWKING AUDITORIUM

AᴛM | **PHYSICS & ASTRONOMY**
TEXAS A&M UNIVERSITY