



THE UNIVERSITY OF  
CHICAGO

Department of Statistics  
STATISTICS COLLOQUIUM

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Combining Transit and Radial Velocity Data to Infer the Planet  
Composition Distribution

MONDAY, November 14, 2016, at 4:00 PM  
Eckhart 133, 5734 S. University Avenue  
*Refreshments following the seminar in Jones 111*

#### ABSTRACT

The Kepler Mission, combined with ground based radial velocity (RV) follow-up, has revolutionized the observational constraints on sub-Neptune-size planet compositions. Kepler's unprecedentedly large and homogeneous samples of planets with both mass and radius constraints open the possibility of statistical studies of the underlying planet composition distribution. This presentation will describe the application of hierarchical Bayesian models to constrain the underlying planet composition distribution from a sample of noisy mass-radius measurements. This approach represents a promising avenue toward a quantitative measurement of the amount of physical scatter in small planet compositions, the identification of planet sub-populations that may be tied to distinct formation pathways, and empirical constraints on the dominant compositional trends in the planet sample. Both the transit and radial velocity techniques are subject to selection effects, and approaches to mitigate the resulting biases will be addressed. In addition to distilling composition-distribution insights from the current sample of Kepler planets with RV masses, this framework may be used to optimize the target selection for future transiting planet RV follow-up surveys.

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