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**Laura Kubatko\*** (kubatko.2@osu.edu), **Julia Chifman** (chifman@american.edu) and **Jing Peng** (peng.650@osu.edu). *Coalescent-based Estimation of Speciation Times Using Site Pattern Frequencies.*

The advent of rapid and inexpensive sequencing technologies has necessitated the development of computationally efficient methods for analyzing sequence data for many genes simultaneously in a phylogenetic framework. The coalescent process is the most commonly used model for linking the underlying genealogies of individual genes with the global species-level phylogeny, but inference under the coalescent model is computationally daunting in the typical inference frameworks (e.g., the likelihood and Bayesian frameworks) due to the dimensionality of the space of both gene trees and species trees. In this talk, I consider the estimation of species tree branch lengths, and show that simple estimators for the branch lengths can be derived based on observed site pattern frequencies. Properties of these estimators, such as their asymptotic variances and large-sample distributions, will be examined, and performance of the estimators will be assessed using simulation. (Received January 31, 2018)