

# A Tour of Oblique Random Survival Forests

By: Nicholas Pajewski, PhD

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**Tuesday, October 22nd | 3:30PM - 4:30PM**  
**Location: MEB M2050-M2070**

The oblique random survival forest (RSF) is a supervised learning method for right-censored outcomes that develops an ensemble of de-correlated oblique survival trees. Trees in the oblique RSF are grown using linear combinations of predictors to recursively partition training data, whereas in the standard RSF, a single predictor is used. Oblique RSF ensembles can offer gains in prediction accuracy, as we will demonstrate through an application to developing race-specific prediction models for incident heart failure using several large cardiovascular cohort studies. However, these gains in accuracy come at the cost of high computational overhead and limited options for assessing variable importance to aid in model interpretation. We will discuss several modifications designed to increase computational efficiency of the oblique RSF. Similarly, we will show how these modifications allow for computation of traditional measures for model interpretation, such as variable importance and partial dependence, that were previously challenging to compute for large data sets. In benchmarking experiments, we find that our enhanced implementation of the oblique RSF, contained within the aorsf R package, is hundreds of times faster, with equivalent prediction accuracy, compared to existing software for oblique RSFs. Finally, we will discuss ongoing directions with this work, including applications to regression, classification, and the competing risks setting.



## Nicholas Pajewski, PhD

Nicholas M. Pajewski, PhD, is a prominent figure in the field of biostatistics and data science. He is currently a professor at Wake Forest University School of Medicine<sup>1</sup>. Dr. Pajewski completed his BS at Loyola University Chicago in 2002 and earned his PhD from the Medical College of Wisconsin in 2008.

He is actively involved in several professional organizations, including the Gerontological Association of America and the American Geriatrics Society. Dr. Pajewski also serves as the director of statistical analytics for the Center for Health Care Innovation at Wake Forest.