



# THE UNIVERSITY OF CHICAGO

Department of Statistics

## DISSERTATION PROPOSAL

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Shape-Constrained Random Forests and Discrete Choice

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Jones 304, 5747 S. Ellis Avenue

### ABSTRACT

Shape-constrained regression methods allow practitioners to dispense with restrictive parametric assumptions while retaining many of their appealing properties. These methods allow for qualitative and interpretable assumptions on the true regression function such as monotonicity, convexity, and unimodality. A method is proposed for efficiently estimating shape-constrained random forests.

Discrete choice modeling refers to the study of consumer behavior in the face of discrete economic alternatives. A second method is proposed for using random forests to estimate utility functions based on discrete choice data.

While these methods might be of independent interest, they can be used in tandem to accurately estimate utility functions with common shape-constraints assumed in economics such as concavity and monotonicity.

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