

Research Interests of Dr. Lianjun Zhang

1. *Various Aspects of Forest Growth and Yield Modeling:*

(1) **Stand level:**

- growth and yield equations (volume, basal area, height, mortality, regeneration, ingrowth)
- juvenile growth relationships
- stand density management tools (e.g. stand density management diagram or stocking chart) based on biological and ecological rationales (e.g. self-thinning, constant final yield, competition-density effects)

(2) **Individual tree level:**

- relationships between tree volume, tape, basal area, height, and crown
- tree survival / mortality
- inter- and intra-species competition

(3) **Tree dbh or basal area class distributions:**

- relationships between species components and whole stand dbh distributions;
- dynamics of dbh distribution over time
- dbh distributions of multi-species stand
- distribution changes due to silvicultural treatments

(4) **Modeling the effects of silvicultural treatments:**

- fertilization and thinning
- vegetation control and site preparation

2. *Modeling spatial distribution of Mixed-Species Stands:*

- point pattern analysis and marked point pattern analysis of tree distribution and stand structure
- spatial autocorrelation between tree variables
- local analysis and modeling of tree competition and growth
- multi-resolution or multi-scale analysis of tree distribution and stand structure

3. *Application of Statistical Methods and Techniques in Forest Growth and Yield Modeling:*

- finite mixture models
- neural network models and fuzzy set
- bivariate joint distributions
- generalized linear models
- generalized additive models
- nonparametric regression models
- wavelets and functional analysis