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
   - spatial statistics, analysis and modeling