**Mentor's Name** | Dr. Mei Chen  
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**Department** | Mathematical Sciences  
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**Research Subject Area** | Mathematical Modeling

### A. Briefly describe overall research program at your laboratory.

See description below….

### B. Briefly describe specific project(s) for your teacher:

Mathematical models are of great importance in natural sciences and engineering. Often a mathematical model: discrete or continuous, linear or nonlinear, explicit or implicit, static or dynamical, deterministic or probabilistic, is chosen to best fit the given information from a real-world application. For this RET project, we will first study

1. mathematical models that require use of differential (difference) equations, curve fitting, graphing, matrices, calculus, and maximization and minimization; and
2. computing tools in Excel and MatLab (Matrix Lab), to implement these models.

Methods of analyzing the stability of a models and estimating approximation errors will also be studied. Each studied model will be applied to a real-world application. Some of these applications for the RET program are:

- The ecosystem changes after white wolves were re-introduced in the Yellowstone National Park.
- Traffic flow management with variable signal light periods in Charleston area.

Each participant will choose one real-world application as his/her main project to work out details. We look forward to hosting you!

### C. Will any other people (post docs, grad students, undergraduate students, colleagues, etc.) be involved directly with your teacher?

There may be one graduate student that will work with the teacher.

### D. Will you require any advanced reading/preparation for the teacher? If yes, please briefly describe.

Some brief reading on background information on real-world applications will be required to help the program participant choose an application for his/her project. We will go over the reading materials with each participant at the beginning of the program.