

## **AIMS<sup>2</sup> Research Project in Civil Engineering Program**

**Research Duration:** Summer 2019 (June – August 2019)

**Faculty:** Prof. Tzong-Ying Hao

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**Title of Project:** Parametric Study of Soil-Structure Interaction on Building Structures

**Maximum number of students:** 4

### **Project Description**

In seismic design, the fundamental period of vibration is one of the governing factors from which other design parameters are derived. This project utilizes a computer application to determine the fundamental period of the vibration response of building model, focuses on the structural structures and includes soil-structure interaction models imposing boundary conditions necessary to impart the earthquake motion. This project also focuses on quantifying the uncertainties in the predicted response.

### **Goals and Objectives of the Project**

- (1) Introduce skills for finding and reviewing technical papers,
- (2) Introduce fundamental theory of vibrations and modeling techniques,
- (3) Learn and use EE-UQ tool (a computer application to determine the responses),
- (4) Perform simulations for various combinations of seismic parameters, and review and summarize the results on spreadsheets, and
- (5) Investigate the effects of soil-structure interaction on building vibration responses.

### **Expectations**

Student research assistants are expected to:

- Attend weekly meetings and to work 12 to 16 hours per week,
- Have fundamental engineering background, such as Statics and Mathematics,
- Have computer aided graphic skill,
- Present their work in the AIMS<sup>2</sup> Research Symposium (early Fall 2019, TBA), and
- Be willing to learn while learning and think deeply about this project.

### **Outcomes**

Through this project students will:

- (1) Develop research skills such as an ability to develop and refine good questions to get needed information,
- (2) Be engaged to engineering problem-solving steps, and
- (3) Enhance their presentation skills.