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Development and Implementation of an Interactive Webpage Platform for Environmental Modeling Education

Project Number: 6000830

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Grant Type: TDG

Abstract:

Computer modeling is the key method to design control strategies and make predictions for today's environmental issues. This makes modeling skill essential for an environmental engineering career. Environmental Systems Modeling (SEE4204) and Air Quality Modeling (SEE4219) are the two modeling courses for undergraduate program of Environmental Science and Engineering, which provide unique opportunities for the students to analyze real-world environmental problems with computing techniques. Both courses include fundamentals of mathematical modeling, environmental science, as well as practices for model establishment and analysis. For such modeling courses, students usually find difficulties to learn the theoretical knowledge, conduct applied exercises, and review programming basics (learnt in their 1st year) at the same time. To overcome this difficulty, this project aims to develop an interactive webpage platform to help students connect mathematics, environmental problems, modeling ideas, and computer programming in an interactive and efficient way. The webpage platform will include a series of learning modules corresponding to different teaching topics, each of which brings together lecture notes, data, equations, executable code, and visualizations. Interactive features of these learning modules will also allow the students to actively build their own models and analyze simulation results. This project takes advantage of the PI's unique research discipline in environmental modeling and student needs in SEE. The implementation of the innovative webpage platform will raise students' enthusiasm in applying theoretical knowledge to address real-world environmental problems with their own active thinking. The success of this project will also provide a framework of interactive learning platform that can be used in other similar courses.