



CEE undergraduate Nao Nishio, right, discusses her research work with Senior Research Engineer C. Tyler Dick.

Research Experience for Undergraduates

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BY NAO NISHIO, CEE JUNIOR

As a junior focusing in Transportation for my primary and construction materials for my secondary concentration, this fall I had the great pleasure of participating in the Research Experience for Undergraduates (REU) program. I conducted research on an historical review of commuter rail energy consumption trends in the United States under Senior Research Engineer C. Tyler Dick, P.E., and Graduate Research Assistant Gio DiDomenico.

The main part of my work involved gathering data from the National Transit Database (NTD), compiling the data from 1997 to 2011, and characterizing each commuter rail. I also analyzed historical changes in various system properties and efficiencies. This research is part of a larger research scope aimed at comparing energy efficiency of passenger rail systems to competing modes of travel. Overall this research will provide insight into which systems will be used in case studies for future research.

This was my first time getting involved in a research project here on campus, and I enjoyed everything about it. The work covers a topic I really enjoy learning about. Within the transportation engineering program there are three possible concentrations: facilities, systems and

railroad transportation engineering. This research is the closest thing to my interest since it involves passenger rails and environmental concerns. I consider myself pretty lucky to have been able to work in a research area that I am interested in.

The best part of this research is that it can take place anywhere in the world; I just need my laptop with me! The flexibility of this research has enabled me to manage my time efficiently on top of my course loads and involvement with multiple student organizations – Alpha Omega Epsilon Engineering Sorority, American Railway Engineering and Maintenance-of-Way Association (AREMA), Engineers Without Borders, Engineering Career Services and the New Student Program. Being able to do research without interfering with my academics or sacrificing my other passions is something I appreciate as an undergrad.

Throughout the semester I saw personal growth in managing my time, and I have increased my knowledge in railroad transportation engineering. The materials taught in class relate to the research, and I have seen a tremendous increase in

CEE's Research Experience for Undergraduates (REU) program is growing, offering more and more students the chance to participate in research. The department contributes \$2,000 for a student's semester in the program – \$1,500 to the student and \$500 to the supervising professor. Students spend at least 10 hours per week on the research for 12 weeks during the fall and spring semesters. They must devote at least 20 hours per week for six weeks during the summer break. At the end of their participation, they must turn in a final product, such as a report, presentation or newly developed software code. The department's goal is to fund 40 undergraduate students per year in the REU program. Alumni giving to the REU program has made many of these positions possible.

my motivation to learn in class.

Through participation in the REU program, I've realized that research is an important factor that supports our sustainable development. I have begun to think about pursuing a master's degree after graduation. As an ambitious freshman, I wanted to attend graduate school here, but my first two years showed me the opportunities that industry had waiting for us, and I considered jumping on that bandwagon after attaining my bachelor's degree. Through the REU program, as well as discussions with my advisers, professor, students and even alumni from the railroad engineering program, I've changed my mind about higher education. This experience touched me in many ways, and now I am committed to continue learning in this field. ■