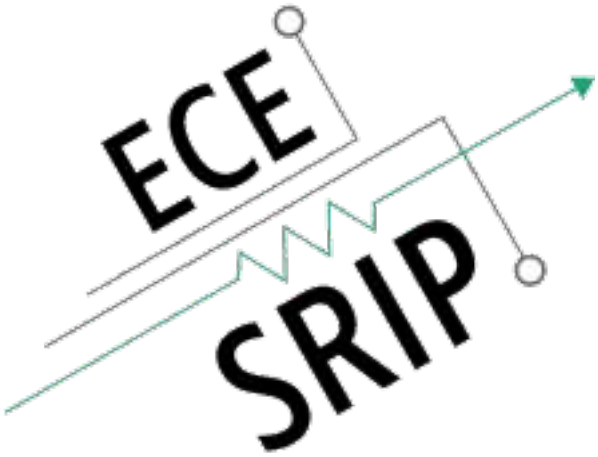


FACULTY MENTOR
Yuanyuan Shi

PROJECT TITLE
Individual Carbon Footprint Profiling and Data Analytics

PROJECT DESCRIPTION
Description: Many of our daily activities lead to greenhouse gas emissions. For example, we produce carbon emissions from burning gasoline when we drive, using electricity for office and home cooling, where the electricity is generated from coal, natural gas, and oil. Carbon footprint vary among individuals depending on a person's location, daily routines, and personal preferences. For example:

1) The quantity of emissions from your choices for transportation, such as walking, cycling or driving. Also, how much you drive and how you drive.

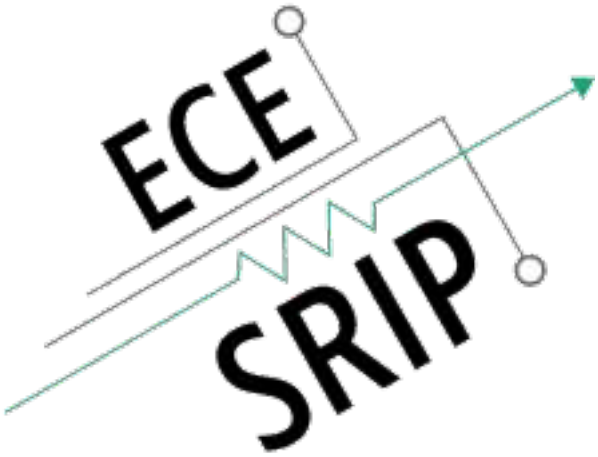
2) The quantity of your home and office electricity consumption, depending on the generation type, building size/structure/material and usage pattern.

In this project, by leveraging personal transportation data from mobile phones, online carbon maps and different data sources, we aim to 1) develop method for computing and visualizing individual carbon footprint; 2) perform user clustering according to their carbon footprint patterns that may be exploited later for residential carbon reduction programs; 3) examine structural and behavioral determinants for individual's carbon footprint.

This project can accommodate both remote and in-person students.

INTERNS NEEDED
2 Students

PREREQUISITES
1. Experience with data analysis and machine learning; proficient in one programming language



FACULTY MENTOR
Yuanyuan Shi

PROJECT TITLE
Data-driven Electric Vehicle Fleet Charging Simulation and Applications

PROJECT DESCRIPTION
Description: Electric vehicles (EVs) are a key element in the energy transition process, and also have potential to drastically reduce the carbon-footprint of the transportation sector. However, the growth of EVs also raised the question for the grid to accommodate the massive growing loads.

In this project, we focus on the coordination of EV fleet, for example like fleet of autonomous delivery vehicles powered by battery (one example like https://www.nuro.ai/). The core challenge in this setting is how to coordinate the charging of a large number of EVs such that minimizes the operational cost and maximize their utilization rate.

In this project, by leveraging real-world transportation and power network data, we aim to 1) develop a data-driven, open-source simulator for EV fleet charging. Specially, we would like to include number of EVs, order delivery schedule, charging station locations and charging price as inputs, based on our experience in real-world systems; 2) evaluate the performance of different optimization and machine learning algorithms for EV fleet path planning and charging scheduling, compare their performance and visualize the results.

This project can accommodate both remote and in-person students.

INTERNS NEEDED
2 Students

PREREQUISITES
1. Proficient in one programming language; have taken at least one or more optimization and machine learning courses.