Electric vehicles (EVs) are the future of California's transportation system, but advancements in several key enabling technologies lag behind, which has slowed the adoption of EVs, especially in rural communities where people tend to drive farther and charging stations are less available. This project is focused on one such enabling technology, lubricants for mechanical systems. Lubricating oils and grease are used in every moving mechanical part of a vehicle and so directly affect the energy efficiency and, therefore, the range of EVs, as well as the useful life of mechanical systems in those vehicles. However, lubricants are subject to entirely new and extreme conditions in EVs and there is currently no method available to characterize or evaluate the potential effect of new lubricant technologies on mechanical efficiency. This project aims to fill that need by partnering with Rtec Instruments in San Jose CA (see *letter of support*) to develop a new benchtop test specifically for lubricants in EV conditions. At the completion of the one-year project, the new test system and protocol will have been developed, demonstrated, and shared widely with the engineering community in California and beyond. This will accelerate progress towards more energy efficient and longer-range EVs which will, in turn, facilitate adoption of these sustainable transportation options, particularly in rural areas like the Central Valley.

The project directly addresses the CA climate priority to Accelerate Nature-Based Climate Solutions and Strengthen Climate Resilience of Natural Systems by minimizing adverse environmental impacts of the transportation system. The project also addresses the priority to Partner and Collaborate to Leverage Resources by coordinating with universities to share climate adaptation and resilience research and training opportunities. Specifically, the research will be performed by one graduate student and three undergraduate students at UC Merced. These students will work side-by-side with engineers at our industry partner, Rtec Instruments, such that the project provides workforce training for the diverse, next generation of engineers and researchers in California.