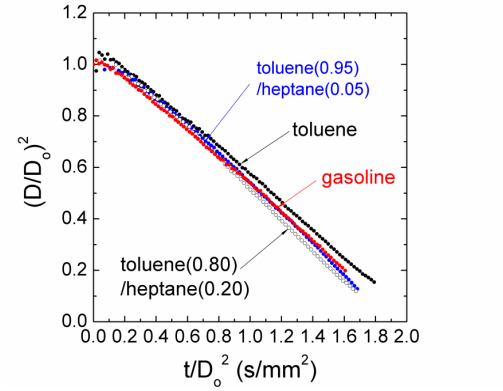
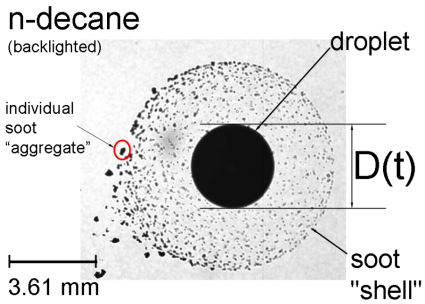
Combustion Dynamics of Transportation Fuel Droplets

This project is in the field of liquid fuel combustion. The goal is to understand how transportation fuels burn to improve the fuel efficiencies of combustion engines, and to reduce the consumption of petroleum fuels and the harmful emissions they generate.
A unique facility at Cornell and the International Space Station has developed a large body of raw data (digital video images) of the burning histories for a range of fuels under conditions whereby droplets can burn without the influence of convection (buoyancy or forced flow) to promote spherical symmetry, which is ideal for modeling. The figures below show a photograph and typical data derived from such images.





photograph of a n-decane droplet at one evolution of droplet diameter (D); instant during its burning history. slope is the "burning rate"

A key component of the project would be assisting with experiments and analysis of the results by extracting quantitative data using various computer-based algorithms that will provide fundamental understanding of how liquid fuels burn.
For more information please contact Prof. C. Thomas Avedisian at cta2@cornell.edu [see http://www.mae.cornell.edu/mae/people/profile.cfm?netid=cta2 for relevant publications].