

Title: High performance lubricants for Electric Vehicles using ordered fluids

The tribology laboratory in the Kate Gleason College of Engineering at the Rochester Institute of Technology (Rochester, NY) is looking for dedicated students with mechanical engineering background and strong interest in chemistry and experimental research.

Project Description: Passenger cars with internal combustion engines (ICE) are not only a major factor on energy consumption but also generate a considerable part of greenhouse emissions. In the last years, the automotive industry has made considerable effort to improve energy efficiency while reducing CO₂ emissions. Electric Vehicles (EVs) represent a more energy-efficient and environmentally-friendly alternative to the currently used ICE cars. However, currently used lubricants have been optimized for vehicles with ICE and are no longer appropriate to meet the new requirements in terms of loads, speeds and temperature, of EVs technology.

Ionic Liquids (ILs) have demonstrated great potential to be used as high performance lubricants or additives for different materials. ILs are salts with melting points below 100°C and excellent physicochemical properties. The polar nature of the ILs enables the formation of surface protective thin films, reducing friction and wear of mating surfaces.

In this project, the lubricating ability of new families of ILs will be investigated as neat lubricants and additives to several low viscosity base oils. This project will include the synthesis and characterization of new families of PILs and experimental macro-/nano- characterization of their tribological properties to develop the knowledge necessary for the rational use of these promising ionic fluids in EVs.

Benefits: Successful candidate will receive tuition fees waiver and stipend for 3 years with the possibility of additional funding.

Qualifications:

- Academic background/degree(s) in mechanical engineering (or related field) with strong interest in chemistry and materials science.
- Fluency in English (written and spoken)
- Ability to write scientific papers

How to apply: If you are considering applying, please send curriculum vitae to Dr. Patricia Iglesias (pxieme@rit.edu).