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**Ph.D. project title:** "Innovative ionic liquids as friction reducers and antiwear additives in lubricants"

**Research summary:** The project deals with the study, design, synthesis and characterization of innovative ionic liquids and deep eutectic solvents. Ionic liquids are low melting salts (melting point below 100 °C) that have attracted interest in many different research fields. They possess unique physico-chemical properties, such as non-flammability, non-volatility and in general, high electrical conductivity and high thermo-oxidative stability, that make them promising candidates in several industrial application. Furthermore, it is possible to modulate these properties by choosing and changing different cations or anions potentially obtaining billions of different combinations. In this context, the purpose of the study is the evaluation of the lubrication and antimicrobial characteristics of these compounds for pharmaceutical machinery and technologies.