D@ELLI is an acronym of a project entitled "Wireless **D**eposition of materials **at** the **E**lectrified 3D **L**iquid-**L**iquid **I**nterfaces".

In **D@ELLI** we will be controlling the Galvani potential difference across the electrified liquid-liquid interface (eLLI) via propel formulation of the aqueous and the organic phase. In other words, by dissolving different chemical species in mutually immiscible phases (oil and water) we will be creating ionic battery. This also means, that solid electrodes, which are indispensable piece of electrochemical set-ups, can be simply skipped. Wireless electrochemical configurations have a huge advantage when it comes to designing liquid-liquid interface geometry. As such, we plan to move from a planar systems (soft junction formed when one phase is placed on top of another) to 3D liquid-liquid interfaces having a form of emulsion (dispersion of small droplet in second immiscible solvent), layered system (multiple immiscible phases alternatively flowing through each other), and mixture of immiscible aerosols (chamber filled with the aqueous and the organic phase droplets suspended in air).

The choice of the platform (liquid-liquid interface) along with its various geometries is not accidental as we plan to use it to synthesize new materials: polymeric films alone, metallic nanoparticles alone, and both materials as a blend. The synthesis of these materials at the electrified liquid-liquid interface has a very few advantages as: (i) the electrochemical control (wireless) can reduce the amount of monomers and the metallic nanoparticles precursors – reducing the total price of the synthesis; (ii) immiscible phases can be used especially when monomers do not want to dissolve in one solvent; (iii) anticipated geometries will be used to control the final materials size, porosity and properties.

Although this work will be mainly focused on the fundamental understanding of the anticipated platform we plan to evaluate its utility as adsorbents for environmental pollutants (materials capturing the chemical species such as dyes or antibiotics) and electrocatalysts in a form of interfacially formed metallic nanoparticles (to facilitate the conversion of chemicals with the help of electricity).