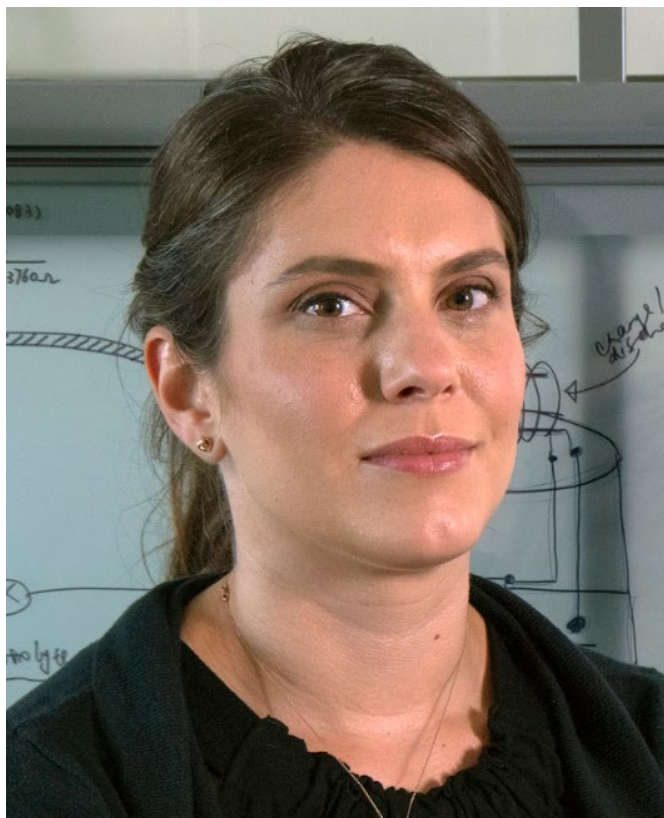


PHYSICAL CHEMISTRY SEMINAR



Prof. Lauren Marbella

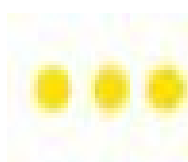
Department of Chemical Engineering
 Columbia University

Monday, May 15, 2023

4:00 PM | YH 4222

Mani L. Bhaumik Collaboratory -
 Dongwon Yoo Seminar & Conference Hall

Tracking Degradation in Commercial Li Batteries with High Chemical, Spatial, and Temporal Resolution



Abstract: Although Li metal anodes offer the highest possible specific energy density for Li-based batteries, practical application is plagued by the growth of high surface area Li deposits. The presence of these Li filaments is correlated with the formation of dead (electrochemically inactive) Li that leads to low Coulombic efficiency (CE) and serious safety concerns due to short-circuiting. Li filament growth is strongly coupled to the composition and the spatial arrangement of the solid electrolyte interphase (SEI) that forms during contact with a liquid electrolyte and continues to evolve over the course of electrochemical cycling. In this talk, I will discuss our efforts to use operando nuclear magnetic resonance (NMR) spectroscopy to probe buried interfaces in these systems and quantitatively detect Li microstructural growth, dead Li formation, and electrolyte decomposition to determine the precise mechanisms of failure in realistic Li battery cells, including commercially-available multilayer pouch cells.