Monolayers of Transition Metal Dichalcogenides (TMDs) of MX$_2$ type (M=Mo or W and X=S or Se) exhibit promising potential for future 2D nanoelectronics. We’ll present methods for controlling their optical and electronic characteristics through the engineering of their dielectric environment, employing photochemical methods, and applying mechanical strain. We investigated WS$_2$ monolayers on pre-patterned Si/SiO$_2$ substrates with cylindrical wells of 3 μm in diameter, analyzing strained and suspended areas. Raman mapping experiments quantify strain, revealing a 10-fold enhanced PL efficiency with strong neutral excitonic emission in suspended areas. TMD optoelectronic properties are chemically controlled by modulating the Fermi level using UV-assisted photochlorination processes [1-3]. Systematic shifts and relative intensities between charged and neutral excitons indicate a controllable decrease in electron density switching WSe$_2$ from n-type to p-type semiconductor. Investigating isotropic, biaxial strain at room temperature on WS$_2$ monolayers shows a strong shift ~130 meV/% of strain in neutral exciton emission and a decrease in circular polarization degree [4]. The analysis reveals the interplay of energy and polarization relaxation channels, as well as variations in the exciton oscillator strength affecting the long-range exchange interactions.