Precision Flavor Physics is a very powerful way to search for New Physics while carrying out stringent tests of the Standard Model (SM). Lattice Gauge Theory (LGT) is playing a major role in this effort, providing experimentalists and phenomenologists with the nonperturbative QCD inputs necessary for accurate comparisons between theory and experiment. Much effort is also being devoted to determinations of SM parameters, such as quark masses, the strong coupling $\alpha_s$ and CKM matrix elements. This talk will present some examples of LGT calculations that are impacting tests of the SM and searches for physics beyond the SM.