Catalytic C-C and C-heteroatom bond forming reactions represent key transformations for the synthesis of valuable products or advanced intermediates. In this presentation our introduction to this field as well as the recent efforts for the development of new and valuable nickel catalyzed functional group interconversions will be highlighted. These include direct dealkoxylative, decarbonylative and decarboxylative reactions. Furthermore, light mediated combined metal and photoredox catalyzed transformations, including C(sp3)-H functionalizations and olefin difunctionalizations will be presented.