Conjugated organic oligomer and polymer materials are being increasingly considered for their incorporation as the active semiconductor elements in devices such as photo-voltaic cells, light-emitting diodes, or field-effects transistors. In the operation of these devices, electron-transfer and energy-transfer processes play a key role, for instance in the form of charge transport (in the bulk or across interfaces), energy transport, charge separation, or charge recombination [1]. Here, we provide a theoretical description of electron-transfer phenomena based on electron-transfer theory, which allows us to provide a molecular, chemically-oriented understanding. In this presentation, we focus on the parameters that impact the mobility of charge carriers [2], that is the electronic coupling within chains and between adjacent chains and the reorganization energy of the chains upon ionization. Materials under study include conjugated oligomers such as oligoacenes, oligothiophene-acenes, oligothiophenes, and oligothienacenes.