Due to the large spatial and temporal scales involved, the modeling of Soft Matter frequently relies on efficient coarse-grained simulation techniques. Here we will focus on hybrid particle/classical density-functional-based models. There the non-bonded interactions between the coarse-grained degrees of freedom are represented through effective Hamiltonians which are functionals of collective variables (e.g. the local densities of the different components). In our case, contrary to other approaches also invoking collective variables (e.g. Landau-Ginzburg methods) the collective coordinates are not the primary degrees of freedom but are determined from the underlying coordinates of the elementary constituents. Since the elementary degrees of freedom are incorporated explicitly, these models can be considered within conventional, particle-based simulation techniques (e.g. Monte Carlo methods). At the same time, the description of the interactions via collective variables allows for a straightforward implementation of these models within the framework of field theoretical approaches, e.g., the Single-Chain-in-Mean-Field (SCMF) simulations scheme and the Self Consistent Field (SCF) theory. At the first part of the presentation, we will clarify the concept of the hybrid models and discuss some technical aspects of the related simulation techniques. In the hybrid models choosing the appropriate functional for the description of the systems and the phenomena of interest, essentially constitutes the analog of tuning the force-field in the conventional coarse-grained approaches. However, comparing to the latter, the calibration of the hybrid models is frequently more transparent since the parameters of the functional can be related (commonly within a mean-field approximation) to some characteristic properties of the material. At the second part of the talk, this issue will be highlighted by presenting the first results of the application of hybrid techniques to the study of the morphologies in organic semiconductor materials.