Heavy-fermion superconductor CeCu$_2$Si$_2$ is a prototype of non-BCS superconductors in strongly correlated electron systems. Despite intensive studies, the superconducting mechanism and even superconducting gap structure still remains unsolved [1]. We here investigate possible superconductivity on the basis of a recent advanced first-principles approach. We find that the promising candidate is an $s_{\pm}$-wave state, like in the iron-based superconductors [2]. This $s$-wave pairing state is in sharp contrast to the widely believed line-nodal $d$-wave state. We will show the present situation of microscopic studies in heavy-fermion superconductors, together with our recent work in Ce115 systems [3].