The main cause of cancer deaths is normally not the primary tumor, which can be resected well, if the tumor is not spread. The main cause of cancer deaths is rather the ability of a certain set of cancer cells from the primary tumor (of epithelial origin) to form metastases in targeted organs. These subsets of aggressive and metastatic cancer cells can migrate out of the primary tumor, migrate through the surrounding 3D tissue matrix, intravasate into blood or lymph vessels, get transported with the vessel flow and form either a secondary tumor in the vessel or possibly extravasate through the endothelial vessel wall, invade into the extracellular matrix to build up a secondary tumor in the connective tissue of the targeted organ. Thus, the endothelium seems to play an important role in regulating cancer metastasis. In past, the endothelium has been reported to inhibit cancer cell transmigration in representing a strong barrier similar as established for leukocyte (immune cell) extravasation upon tissue injury. The research group has demonstrated that the endothelium is for certain cancer cells no barrier, it is even an enhancer for cancer cell invasion. In particular, they have shown that the aggressive and invasive cancer cells alter the mechanical properties of the endothelial cells such as stiffness and cytoskeletal remodeling dynamics, which may help certain cancer cells to migrate through. The knowledge of the parameters that drive the invasion of a certain subset of cancer cells out of the primary tumor may help to determine whether a primary tumor will metastasize or not and may additionally provide hints for the development of substances inhibiting cancer cell metastasis.