Tremendous progress has been made during the last decades to promote applications of nano-manufacturing technologies, and especially microfluidic devices, in life sciences but it is still challenging to identify large-scale killer applications. In this talk, I will discuss two examples of our on-going efforts along this direction.

Firstly, by mimicking the organization of the in-vivo extracellular matrix we fabricated gelatin monolayer nanofibers as cell culture substrate (*cPatch*) for human pluripotent stem cells (hPSCs) and succeeded efficient differentiation of hPSCs toward cardiac, neuronal and other tissue types. This method is applicable for large-scale manufacturing as well as plug-and-play electrophysiological measurements, microfluidic device integration, disease modeling, tissue repairing, etc.

Secondly, by investigating the flow dynamics and cell migration behavior, we developed a new method to isolate circulating tumor cells (CTCs) using a conical shape micro-hole array (*cFilter*). Comparing to other isolation methods, this method is advantage in term of selectivity and efficiency for CTC isolation. Cancer diagnosis and treatment could be conducted more intelligently.

Both *cPatch* and *cFilter* are currently under industrial development. Together with automated stem cell processing and CTC analyses, a broad range of applications is expected.