What is claimed is:

1. A bioprocessing system comprising: a bioreactor; a tangential flow depth filtration (TFDF) unit comprising a melt-blown thick-walled hollow fiber formed from at least one polymer and comprising a porous wall having a pore size and a density, the porous wall defining a lumen that is in fluid communication with the bioreactor; a permeate fluid outlet in fluid communication with the porous wall; and a pump in fluid communication with the lumen; wherein the density is between 51% and 56% of the density of an equivalent solid volume of the polymer.

~~2. The bioprocessing system of claim 1, wherein the average pore size is about 0.2 μm to about 10 μm with a 90% nominal retention.~~

2~~3~~. The bioprocessing system of claim 1, wherein the density is about 53%.

3~~4~~. The bioprocessing system of claim 1, wherein the porous wall has a thickness ranging from 2 mm to 7 mm.

4~~5~~. The bioprocessing system of claim 1, wherein the pump is configured to provide a pulsed flow of fluid through the lumen.

5~~6~~. A method of culturing cells in a perfusion bioreactor system comprising a culture vessel fluidly connected to a tangential flow depth filtration (TFDF) unit comprising a melt-blown thick-walled hollow fiber formed from at least one polymer and comprising a porous wall having a pore size and a density, the TFDF unit having a retentate channel and a filtrate channel, comprising the steps of: flowing a culture medium from the culture vessel through the retentate channel of the TFDF unit, whereby a fraction of the culture medium passes into the filtrate channel; and returning fluid from the retentate channel to the culture vessel; wherein (a) the culture medium comprises at least $60x10^6$ cells/mL and (b) the method is performed for at least 8 consecutive days; wherein the density is between 51% and 56% of the density of an equivalent solid volume of the polymer.

6~~7~~. The method of claim 5~~6~~, wherein at least 80% of the cells are viable throughout the 8

consecutive days.

78. The method of claim 56, further comprising a step of adding to the system a volume of fresh culture medium equal to a permeate volume.

89. The method of claim 78, wherein the step of adding the volume of fresh culture medium comprises adding at least 2 times a volume of the culture vessel to the system per day.

910. The method of claim 56, wherein the culture medium comprises a bioproduct of interest, and a rate of sieving of the bioproduct of interest is at least 99% throughout the 8 consecutive days.

1011. The method of claim 56, wherein the TFDF unit comprises a porous thick-walled hollow fiber comprising polymer, wherein a density of the porous thick-walled hollow fiber is between 51% and 56% of the density of an equivalent solid volume of the polymer.

1112. The method of claim 1011, wherein the density is about 53%.

1213. The method of claim 1011, wherein a wall of the porous thick-walled hollow fiber has a thickness of 2 mm to 7 mm.

1314. The method of claim 56, wherein the polymer is selected from the group consisting of polyolefin, a polyester, and a combination thereof.

1415. A method of harvesting a biomaterial from a bioreactor system comprising a process vessel fluidly connected to a tangential flow depth filtration (TFDF) unit having a feed/retentate channel and a filtrate channel, comprising the steps of: pumping a culture medium comprising the biomaterial from the process vessel through the feed/retentate channel of the TFDF unit, whereby a fraction of the biomaterial passes into the filtrate channel; returning fluid from the feed/retentate channel to the process vessel; and collecting fluid from the filtrate channel; wherein the TFDF unit comprises a melt-blown thick-walled hollow fiber formed from a polymer and comprising a porous wall, the thick-walled hollow fiber having a density of about 53% of the density of an equivalent solid volume of the

polymer, the porous wall defining a lumen of 3 mm to 7 mm that is in fluid communication with the feed/retentate channel, the porous wall having a thickness of about 5 mm; wherein the TFDF unit has a flux above about 400 $L \cdot m^{-2} \cdot hr^{-1}$; wherein the TFDF unit has a peak cell passage of under 5%; wherein a rate of sieving of the bioproduct is at least 99%.

15~~16~~. A method of harvesting a bio material from a bioreactor system comprising a process vessel fluidly connected to a tangential flow depth filtration (TFDF) unit having a feed/retentate channel and a filtrate channel, comprising the steps of: flowing a culture medium through the feed/retentate channel of the TFDF unit, whereby a fraction of the culture medium passes into the filtrate channel; returning fluid from the feed/retentate channel to the process vessel; and collecting fluid from the filtrate channel; wherein the TFDF unit comprises a melt-blown thick-walled hollow fiber formed from at least one polymer and comprising a porous wall, the thick-walled hollow fiber having a density of about 53% of the density of an equivalent solid volume of the at least one polymer, the porous wall defining a lumen that is in fluid communication with the feed/retentate channel.

16~~17~~. The method of claim 15~~16~~, wherein a pore size of the porous wall is about 2 μm with a 90% nominal retention.

17~~18~~. The method of claim 15~~16~~, wherein the flowing step further comprises the use of a pump selected from the group consisting of a centrifugal levitating magnetic pump, a positive displacement pump, a peristaltic, a membrane pump, and an ATF pump.

18~~19~~. The method of claim 15~~16~~, wherein the hollow fiber comprises a lumen having an internal diameter of 0.75 mm to 5 mm therethrough.

19~~20~~. The method of claim 15~~16~~, wherein the hollow fiber has a flux above about 40 $L \cdot m^{-2} \cdot hr^{-1}$.