## CLAIMS

1. A tangential flow filtration system, comprising:

a vessel;

a tangential flow filtration cassette comprising a plurality of permeate channels, the tangential flow filtration cassette substantially enclosed within the vessel such that a permeate flow from each end of the plurality of permeate channels flows into the vessel;

first and second end plates disposed about first and second sides of the tangential flow filtration cassette and the vessel, the first and second end plates positioned to form a fluid-tight seal with at least one of the tangential flow filtration cassette and the flexible vessel; and

a clamping mechanism including a first clamping element disposed adjacent to the first end plate, a second clamping element disposed adjacent to the second end plate, and a plurality of projections coupling the first clamping element to the second clamping element, the plurality of projections extending through a plurality of openings formed in the first and second end plates, the vessel and the tangential flow filtration cassette.

2. The tangential flow filtration system of claim 1, wherein the vessel is elastically deformable.

3. The tangential flow filtration system of claim 1, wherein (a) the tangential flow filtration cassette comprises a plurality of interleaved retentate channels with the plurality of permeate channels, the interleaved retentate and permeate channels separated by at least one filtration membrane, (b) the retentate channels are in fluid communication with a feed port and a retentate port of the tangential flow filtration cassette and are fluidly sealed from the vessel, and (c) the permeate channels are in fluid communication with the vessel ~~and are fluidly sealed from the feed port and retentate port~~.

4. The tangential flow filtration system of claim 3, wherein each retentate channel comprises sealed ends between the retentate channel and the vessel.

5. The tangential flow filtration system of claim 1, wherein the tangential flow filtration cassette comprises a plurality of layered membranes, each layered

membrane comprising two slotted fenestrations at opposing ends of each layered membrane.

6. The tangential flow filtration system of claim 5, wherein alternating layered membranes further comprise a seal disposed about each of the two slotted fenestrations.

7. The tangential flow filtration system of claim 5, wherein alternating layered membranes further comprise a seal disposed along opposing ends of each alternating layer outside of the two slotted fenestrations.

~~8. A tangential flow filtration cassette, comprising:~~

~~a stack of interleaved layers defining at least one feed channel and at least one filtrate channel, the stack of interleaved layers comprising:~~

~~a membrane comprising first and second elongate fenestrations disposed at first and second ends thereof;~~

~~a feed channel seal disposed on a first side of the membrane, the feed channel seal defining an enclosed membrane area comprising the first and second elongate fenestrations; and~~

~~first and second filtrate channel seals disposed on a second side of the membrane opposite the first side, the first and second filtrate channel seals disposed about each of the first and second elongate fenestrations thereby sealing the first and second elongate fenestrations from the corresponding filtrate channel.~~

8~~9~~. The tangential flow filtration cassette of claim 11~~8~~, wherein the tangential flow filtration cassette includes an outer body defining an exterior, the at least one feed channel including a plurality of feed channels, at least one of the plurality of feed channels being ~~is~~ fluidly sealed from the ~~a~~n exterior of the cassette but is open to each of the first and second elongate fenestrations, and the at least one permeate ~~filtrate~~ channel is open to the exterior of the cassette but sealed from both the first and second elongate fenestrations.

9~~10~~. The tangential flow filtration cassette of claim 11~~8~~, further comprising a feed screen configured to substantially fill a volume of the enclosed membrane area defined by the feed channel seal.

10~~11~~. The tangential flow filtration cassette of claim 11~~8~~, further comprising a permeate ~~filtrate~~ screen configured to substantially fill a volume of the permeate ~~filtrate~~ channel outside of the first and second permeate ~~filtrate~~ channel seals.

11~~12~~. A tangential flow filtration system comprising:

a tangential flow filtration cassette, comprising: ~~according to claim 8~~

a stack of interleaved layers defining at least one feed channel and at least one permeate channel, the stack of interleaved layers comprising:

a membrane comprising first and second elongate fenestrations disposed at first and second ends thereof;

a feed channel seal disposed on a first side of the membrane, the feed channel seal defining an enclosed membrane area comprising the first and second elongate fenestrations; and

first and second permeate channel seals disposed on a second side of the membrane opposite the first side, the first and second permeate channel seals disposed about each of the first and second elongate fenestrations thereby sealing the first and second elongate fenestrations from the corresponding permeate channel;

a flexible vessel enclosing at least a portion of the tangential flow filtration cassette, the flexible vessel comprising a permeate outlet; ~~and~~

first and second end plates disposed about first and second sides of the tangential flow filtration cassette and the flexible vessel, the first and second end plates positioned to form a fluid-tight seal with at least one of the tangential flow filtration cassette and the flexible vessel, at least one of the first and second end plates defining a fluid inlet and a fluid outlet aligned with the elongate apertures of the tangential flow filtration cassette; and

a clamping mechanism including a first clamping element disposed adjacent to the first end plate, a second clamping element disposed adjacent to the second end plate, and a plurality of projections coupling the first clamping element to the second clamping element, the plurality of projections extending through a plurality of openings formed in the first and second end plates, the flexible vessel and the tangential flow filtration cassette.

12~~13~~. The tangential flow filtration system of claim 11~~12~~, wherein the flexible vessel comprises a fluid connector that is reversibly connectable to a conduit for permeate.

~~14. A tangential flow filtration cassette, comprising:~~

~~a first membrane comprising a first side and a second side, the first membrane defining a first filtrate channel along the first side;~~

~~a second membrane adjacent the second side of the first membrane, extending substantially parallel with the first membrane, the second membrane defining a retentate channel between the first membrane and the second membrane, and the second membrane defining a second filtrate channel along a side of the second membrane external to the retentate channel;~~

~~a first elongate fenestration along a first end of each of the first membrane and the second membrane;~~

~~a second elongate fenestration along a second end of each of the first membrane and the second membrane;~~

~~a retentate seal disposed about a perimeter of the retentate channel configured to fluidly seal the perimeter of the retentate channel from an external space of the cassette;~~

~~a plurality of filtrate seals within the first filtrate channel and the second filtrate channel, the plurality of filtrate seals disposed about each of the first elongate fenestration and the second elongate fenestration of the first membrane and the second membrane; and~~

~~a flexible vessel enclosing the first membrane and the second membrane such that ends of the filtrate channel are open to the flexible vessel.~~

~~15. The tangential flow filtration cassette of claim 14, wherein the retentate channel is fluidly~~

~~sealed from an exterior of the cassette but is open to each of the first and second elongate fenestrations, and the first and second filtrate channels are open to the exterior of the cassette but sealed from both the first and second elongate fenestrations.~~

~~16. The tangential flow filtration cassette of claim 14, further comprising a retentate screen configured to substantially fill a volume defined by the retentate seal.~~

~~17. The tangential flow filtration cassette of claim 14, further comprising a plurality of filtrate screens configured to substantially fill a volume of each of the first and second filtrate channels outside of the plurality of filtrate seals.~~

~~18. A tangential flow filtration system comprising:~~
~~a tangential flow filtration cassette according to claim 14;~~
~~a permeate outlet in fluid communication with the flexible vessel; and~~
~~first and second end plates disposed about first and second sides of the tangential flow filtration cassette and the flexible vessel, the first and second end plates positioned to form a fluid-tight seal with at least one of the tangential flow filtration cassette and the flexible vessel, at least one of the first and second end plates defining a fluid inlet and a fluid outlet aligned with the first and second elongate fenestrations of the first and second membranes.~~

~~19. The tangential flow filtration system of claim 18, wherein the flexible vessel comprises a fluid connector that is reversibly connectable to a conduit for permeate.~~

~~20. The tangential flow filtration system of claim 18, wherein a volume of the flexible vessel comprises the first and second filtrate channels external to the plurality of filtrate seals.~~

~~21. A method of tangential flow filtration comprising:~~
~~flowing a fluid into a feed inlet into a retentate channel;~~
~~flowing the fluid within the retentate channel tangentially across at least one disposable membrane;~~
~~filtering the fluid across the at least one membrane into a filtrate channel;~~
~~flowing a filtrate along the filtrate channel and out an open end of the filtrate channel; and~~
~~collecting the filtrate within a disposable flexible vessel.~~

~~22. The method of claim 21, further comprising flowing the fluid from the retentate channel through an elongate fenestration of the at least one disposable membrane.~~

~~23. The method of claim 21, wherein flowing the filtrate along the filtrate channel and out the open end of the filtrate channel further comprises flowing the filtrate out of ends of the filtrate channel that are open to the disposable flexible vessel.~~

13~~24~~. The tangential flow filtration system of claim 1, wherein the first end plate includes one or more reinforcing ribs extending therefrom.

14~~25~~. The tangential flow filtration system of claim 1, wherein the first and second end plates are manufactured from a polymer.

15~~26~~. The tangential flow filtration system of claim 14~~25~~, wherein the first and second end plates are non-porous and non-perforated to prevent fluid flow therethrough.

16~~27~~. The tangential flow filtration system of claim 1, wherein the first end plate includes a fluid manifold with a feed port, the fluid manifold providing a sealing surface between the vessel and an outer surface of the cassette.

17~~28~~. The tangential flow filtration system of claim 1, wherein the first end plate includes a feed flow path and a retentate flow path extending therethrough so that permeate flows from the cassette and into the vessel.

18~~29~~. The tangential flow filtration system of claim 1, wherein the first and second end plates are bonded to the vessel.

19~~30~~. The tangential flow filtration system of claim 1, wherein one of the first and second end plates is configured to attach the system to a support structure.