What is claimed is:

1. A manifold, comprising:

a plate having one or more partitions, a first partition of the one or more partitions including:

a first recess shaped and sized to receive a first bio-assembly having a first bio-assembly inlet, a first bio-assembly outlet and a first bio-scaffold that is disposed on a substrate,

a bio-scaffold inlet of the first bio-scaffold being in fluid communication with the first bio-assembly inlet and a bio-scaffold outlet of the first bio-scaffold being in fluid communication with the first bio-assembly outlet; and

an adhesive interface positioned within the first partition to interface with, and apply an adhesive to, the substrate of the first bio-assembly when the first bio-assembly is positioned in the first partition to attach the substrate of the first bio-assembly to the first partition; and

a manifold inlet and a manifold outlet that are in fluid communication with the first bio-assembly inlet and the first bio-assembly outlet, respectively, when the first bio-assembly is positioned in the first partition.

2. The manifold of claim 1, wherein:

a second partition of the one or more partitions includes a second recess shaped and sized to receive a second bio-assembly that has a second bio-assembly inlet, a second bio-assembly outlet and a second bio-scaffold, wherein:

one or both of:

the manifold inlet is in a first fluid communication with both the first bio-assembly inlet and the second bio-assembly inlet; and

the manifold outlet is in a second fluid communication with both the first bio-assembly outlet and the second bio-assembly outlet.

3. The manifold of claim 2, wherein the first fluid communication and/or the second fluid communication are in series.

4. The manifold of claim 2, wherein the first fluid communication and/or the second fluid communication are in parallel.

5. The manifold of claim 2, wherein:

a third partition of the one or more partitions includes a third recess shaped and sized to receive a third bio-assembly that has a third bio-assembly inlet, a third bio-assembly outlet, and a third bio-scaffold, wherein:

the manifold inlet is in a third fluid communication with the first bio-assembly inlet, the second bio-assembly inlet, and the third bio-assembly inlet;

the manifold outlet is in a fourth fluid communication with the first bio-assembly outlet, the second bio-assembly outlet, and the third bio-assembly outlet; and

the third fluid communication and/or the fourth fluid communication are a combination of series and parallel fluid communications.

6. The manifold of claim 2, wherein a substrate of the second bio-assembly is same as the substrate of the first bio-assembly.

7. The manifold of claim 2, wherein a substrate of the second bio-assembly is different from the substrate of the first bio-assembly.

8. The manifold of claim 1, wherein the manifold inlet includes a first manifold inlet and a second manifold inlet each in fluid communication with the first bio-assembly inlet via a first fluid channel and a second fluid channel, respectively.

9. The manifold of claim 8, wherein the first fluid channel and the second fluid channel connect to a common fluid channel prior to reaching the first bio-assembly inlet.

10. The manifold of claim 9, wherein the common fluid channel includes a mixer positioned therein and configured to mix a first fluid flowing from the first fluid channel into the common fluid channel and a second fluid flowing from the second fluid channel into the common fluid channel.

11. The manifold of claim 10, wherein the mixer is a static mixer, a magnetic particle mixer, an acoustofluidic mixer, or an electrophoretic mixer.

12. The manifold of claim 11, wherein the static mixer includes antiparallel fins or helices.

13. The manifold of claim 1, wherein the adhesive is a liquid adhesive and the adhesive interface is an indentation configured to receive and apply the liquid adhesive to the substrate of the first bio-assembly when the first bio-assembly is positioned in the first partition.

14. The manifold of claim 1, wherein the adhesive interface includes a moat configured to prevent fluid leakage from the first partition.

15. The manifold of claim 14, wherein the moat contains ultra-violet or visible light curable resin, air, cyanoacrylate adhesive, silicone gasket, or any combination thereof.

16. The manifold of claim 1, further comprising a bubble outlet positioned upstream from the first bio-scaffold along a fluid channel of the manifold that is configured to carry a fluid therein.

17. The manifold of claim 16, wherein the bubble outlet includes a hydrophobic filter membrane configured to allow gas entrained in the fluid escape the fluid channel.

18. The manifold of claim 1, wherein the first partition further includes a bio-scaffold access channel coupled to a second bio-assembly outlet of the first bio-assembly and configured to transport fluids between an interior of the first bio-assembly and outside the first bio-assembly via the second bio-assembly outlet.

19. The manifold of claim 1, wherein the first bio-scaffold includes a fluid channel extending between the bio-scaffold inlet and the bio-scaffold outlet.

20. The manifold of claim 19, wherein the fluid channel includes a constriction configured to regulate flow of fluids therein.

21. The manifold of claim 1, wherein the first bio-scaffold includes a surface having a sectioning label covalently photocrosslinked thereon and configured to facilitate removal of the first bio-scaffold from the first bio-assembly after the first bio-assembly is positioned in the first partition and the substrate of the first bio-assembly is attached to the first partition.

22. The manifold of claim 21, wherein the sectioning label is a perforation, an indentation or a protrusion.

23. The manifold of claim 1, wherein the manifold inlet is in fluid communication with the first bio-assembly inlet via a first channel and the manifold outlet is in fluid communication with the first bio-assembly outlet via a second channel, one or both of the first channel and the second channel including a constriction configured to regulate flow of fluids therein.

24. The manifold of claim 1, wherein a number of the one or more partitions ranges from about 1 to about 1,536.

25. The manifold of claim 1, wherein a number of the one or more partitions ranges from about 4 to about 96.

26. The manifold of claim 1, wherein the manifold and/or the first bio-assembly are manufactured using an additive manufacturing technique.

27. The manifold of claim 1, wherein the first bio-scaffold is a hydrogel.

28. The manifold of claim 1, wherein the substrate is a glass substrate.

29. The manifold of claim 1, wherein the first bio-scaffold is photocrosslinked to the substrate via a heterobifunctional chemical crosslinker.

30. The manifold of claim 29, wherein the heterobifunctional chemical crosslinker includes a trichlorosilane configured to bond to the substrate and a methacrylate configured to bond to the first bio-scaffold.