What is claimed is:

1. A flow cell, comprising:

a substrate;

a plurality of chambers defined on or in the substrate;

a plurality of depressions defined in the substrate and within a perimeter of each of the plurality of chambers, wherein the depressions are separated by interstitial regions;

primers attached within each of the plurality of depressions; and

a capture site located within each of the plurality of chambers;

wherein the capture site:

(i) is a well that is defined in the substrate, wherein the well has an opening dimension that is larger than an opening dimension of each of the plurality of depressions;

(ii) is a protrusion having a chemical capture agent on a surface thereof; or

(iii) includes a chemical capture agent positioned on a portion of the interstitial regions.

~~2. The flow cell as defined in claim 1, wherein the capture site is a well that is defined in substrate, wherein the well has an opening dimension that is larger than an opening dimension of each of the plurality of depressions.~~

~~3~~2. The flow cell as defined in claim ~~2~~1, wherein when the capture site is a well that is defined in the substrate, it further comprises~~ing~~ a chemical capture agent within the well.

~~4~~3. The flow cell as defined in claim ~~2~~1, wherein when the capture site is a well that is defined in the substrate, it further comprises~~ing~~ a capture bead within the well, wherein the capture bead is coated with a chemical capture agent.

~~5. The flow cell as defined in claim 1, wherein the capture site is a protrusion having a chemical capture agent on a surface thereof.~~

~~6. The flow cell as defined in claim 1, wherein the capture site includes a chemical capture agent positioned on a portion of the interstitial regions.~~

~~7~~4. The flow cell as defined in any of claims 1, 2~~,~~ or 3~~, 4, 5, or 6,~~ further comprising a hydrophobic material positioned on the substrate, wherein the hydrophobic material defines each of the plurality of chambers.

~~8~~5. The flow cell as defined in any of claims 1, 2, 3~~,~~ or 4~~, 5, 6, or 7,~~ wherein each of the plurality of chambers has a height sufficient to block lateral diffusion of released library fragments between adjacent chambers.

~~9~~6. The flow cell as defined in any of claims 1, 2, 3, 4~~,~~ or 5~~, 6, 7, or 8,~~ further comprising a polymer layer in each of the depressions, and wherein the primers are attached to the polymer layer.

~~10~~7. The flow cell as defined in any of claims 1, 2, 3, 4, 5~~,~~ or 6~~, 7, 8, or 9~~, wherein:

each of the plurality of chambers has an opening dimension ranging from about 1 µm to about 1000 µm;

each of the plurality of depressions has an opening dimension ranging from about 1 nm to about 2 µm; and

the chamber opening dimension is greater than the depression opening dimension.

~~11~~8. The flow cell as defined in any of claims 1, 2, 3, 4, 5, 6~~,~~ or 7~~, 8, 9, or 10~~, wherein:

the plurality of chambers is arranged in a first pattern across the substrate; and

respective sub-sets of the plurality of depressions are arranged in a second pattern within in each of the chambers.

~~12~~9. The flow cell as defined in any of claims 1, 2, 3, 4, 5, 6, 7~~,~~ or 8~~, 9, 10, or 11~~, wherein the plurality of chambers is patterned into the substrate.

~~13~~10. A method, comprising:

introducing a plurality of complexes to a flow cell including:

a plurality of chambers;

a plurality of depressions within each of the plurality of chambers;

primers attached within each of the plurality of depressions; and

a capture site in each of the plurality of chambers;

wherein each of the complexes includes:

a carrier; and

sequencing-ready nucleic acid fragments attached to or contained within the carrier; whereby one of the complexes attaches to a respective one of the capture sites in at least some of the plurality of chambers; and

causing the carrier of each complex to release the sequencing-ready nucleic acid fragments therefrom, whereby walls of the respective chambers restrict transport and seeding of the sequencing-ready nucleic acid fragments to respective depressions within each of the respective chambers.

~~14. A method, comprising:~~

~~introducing a plurality of complexes to a flow cell including:~~

~~a plurality of chambers, each having a depth that is at least about 50% of an average diameter of the complexes; and~~

~~primers attached within each of the plurality of chambers;~~

~~wherein each of the plurality of complexes includes:~~

~~a carrier; and~~

~~sequencing-ready nucleic acid fragments from the same template nucleic acid attached to or contained within the carrier;~~

~~whereby at least some of the complexes become trapped in at least some of the plurality of chambers;~~

~~washing away non-trapped complexes from the flow cell; and~~

without introducing an external immobilizing agent to the flow cell, causing the carrier of the trapped complexes to release the sequencing-ready nucleic acid fragments into the respective chamber in which each complex is trapped, whereby transport and seeding of the sequencing-ready nucleic acid fragments are restricted by the depth.

15. The method as defined in claim 14, wherein the depth is about 10 μm or more.

16. The method as defined in any of claims 14 or 15, wherein each chamber has a bottom surface, and wherein one of:

the primers are attached to a polymer layer across the bottom surface; or

the primers are respectively attached to a plurality of spatially segregated polymer islands positioned on the bottom surface.

17. The method as defined in any of claims 14 or 15, wherein each chamber has a bottom surface and a plurality of depressions defined therein, and wherein the primers are respectively attached to a polymer layer within each of the depressions.

18. The method as defined in any of claims 14, 15, 16, or 17, wherein the carrier is a solid support, and wherein the causing involves introducing a cleavage agent to the flow cell or heating the flow cell above an annealing temperature of a first sequence of the sequencing-ready nucleic acid fragments.

19. The method as defined in any of claims 14, 15, 16, or 17, wherein the carrier is a hydrogel support, and wherein the causing involves heating the flow cell, introducing a cleaving agent to the flow cell, or combinations thereof.

20. A method, comprising:

introducing a plurality of complexes to a flow cell including:

a plurality of chambers, each having a depth that is about 5 μm or less;

a capture site within each of the plurality of chambers; and

primers attached within each of the plurality of chambers;

wherein each of the plurality of complexes includes:

a carrier bead; and

sequencing-ready nucleic acid fragments from the same template nucleic acid attached to the carrier bead;

whereby at least some of the complexes become immobilized at respective capture sites;

washing away non-immobilized complexes from the flow cell;

introducing an external immobilizing agent to the plurality of chambers; and

causing the carrier bead of the trapped complexes to release the sequencing-ready nucleic acid fragments into the respective chamber in which each complex is trapped, whereby transport and seeding of the sequencing-ready nucleic acid fragments are restricted by the external immobilizing agent.

21. The method as defined in claim 20, wherein the external immobilizing agent is a gaseous diffusion barrier; a liquid diffusion barrier selected from the group consisting of mineral oil and silicone oil; a viscous medium diffusion barrier selected from the group consisting of glycerol and sucrose; or combinations thereof.

22. The method as defined in any of claims 20 or 21, wherein the capture site is a capture site primer, and wherein each of the complexes includes a complementary primer that can hybridize to the capture site primer.

23. The method as defined in any of claims 20 or 21, wherein the capture site includes a first member of a binding pair and wherein each of the complexes includes a second member of the binding pair.

24. The method as defined in any of claims 20, 21, 22, or 23, wherein each chamber has a bottom surface, and wherein one of:

the primers are attached to a polymer layer across the bottom surface; or

the primers are respectively attached to a plurality of spatially segregated polymer islands positioned on the bottom surface.

25. The method as defined in any of claim 20, 21, 22, or 23, wherein each chamber has a bottom surface and a plurality of depressions defined therein, and wherein the primers are respectively attached to a polymer layer within each of the depressions.

26. The method as defined in any of claim 20, 21, 22, 23, 24, or 25, wherein the causing involves introducing a cleavage agent to the flow cell.

27. A method, comprising:

introducing a fluid including a plurality of complexes into a flow cell, wherein each of the plurality of complexes includes:

a solid support; and

sequencing-ready nucleic acid fragments attached to the solid support; whereby at least some of the plurality of complexes are immobilized by a respective capture site in the flow cell; and

introducing an external immobilizing agent to the flow cell, thereby generating at least a liquid droplet around the immobilized complexes.

28. The method as defined in claim 27, wherein the external immobilizing agent is air that aspirates some of the fluid, including non-immobilized complexes, out of the flow cell.

29. The method as defined in claim 28, wherein the air is introduced into the flow cell at a predetermined flow rate.

30. The method as defined in claim 27, wherein the external immobilizing agent is a liquid medium or a viscous medium that is immiscible with the complexes.

~~31. The method as defined in claim 30, further comprising washing non-immobilized complexes from the flow cell prior to introducing the external immobilizing agent.~~

~~32. The method as defined in claim 30, wherein the viscous medium is a temperature responsive material, and wherein the method further comprises raising a temperature of the flow cell to a seeding temperature to render the temperature responsive material more viscous.~~