**CLAIMS**

1. A first microfluidic device comprising a substrate having a first mating surface, the first mating surface comprising one or more fluidic ports, in which the first mating surface is adapted to stably retain a first protruding liquid droplets comprising a first liquid at the one or more fluidic ports, in which the port of the first microfluidic device comprising the first protruding liquid droplet is aligned with a port of a second mating surface of a second microfluidic device comprising a second protruding droplet so as to permit fluidic communication with the first microfluidic device, in which a pressurized fluid source is in fluidic communication with at least one of the one or more fluidic ports.

2. A microfluidic device according to Claim 1, in which the first mating surface comprises one or more regions surrounding the one or more fluidic ports, and in which the regions are adapted to resist wetting by the first liquid.

3. A microfluidic device according to Claim 2, in which the one or more regions are adapted to be hydrophobic.

4. A microfluidic device according to Claim 2, in which the one or more regions comprise a first material selected to resist wetting by the first liquid.

5. A microfluidic device according to Claim 4, in which the first material comprises a hydrophobic gasket.

6. A microfluidic device according to Claim 1, in which the first mating surface comprises one or more regions surrounding the one or more fluidic ports, and in which the regions are adapted to promote wetting by the first liquid.

7. A microfluidic device according to Claim 6, in which the one or more regions are adapted to be hydrophilic.

8. A microfluidic device according to Claim 1, in which the first mating surface comprises one or more ridges surrounding the one or more fluidic ports.

9. A microfluidic device according to Claim 1, in which the first mating surface comprises one or more recesses surrounding the one or more fluidic ports.

10. A system, comprising:

(a) a pressurized fluid source in fluidic communication with a first fluid port positioned on a first mating surface, the first fluid port comprising a first protruding fluid droplet;

(b) a second fluid port on a second mating surface, the second fluid port comprising a second protruding fluid droplet; and

(c) a mechanism for bringing the first protruding fluid droplet and the second fluid droplet together in a droplet-to-droplet connection, so that fluid can flow from the pressurized fluid source through the first fluid port into the second fluid port.

11. A system according to Claim 10, in which the first protruding fluid droplet protrudes downward from the first mating surface and the second protruding fluid droplet protrudes upward from the second mating surface.

12. A system according to Claim 10, in which the first protruding fluid droplet protrudes upward from the first mating surface and the second protruding fluid droplet protrudes downward from the second mating surface.

13. A system according to Claim 10, in which the mechanism lifts the second mating surface upward into contact with the first mating surface.

14. A system according to Claim 10, in which the mechanism lifts the first mating surface upward into contact with the second mating surface.

15. A system according to Claim 10, in which the mechanism lowers the second mating surface into contact with the first mating surface.

16. A system according to Claim 10, in which the mechanism lowers the first mating surface into contact with the second mating surface.

17. A method of merging droplets, comprising:

(a) providing

(i) a pressurized fluid source in fluidic communication with a first fluid port positioned on a first mating surface, the first fluid port comprising a first protruding fluid droplet; and

(ii) a second fluid port on a second mating surface, the second fluid port comprising a second protruding fluid droplet; and

(b) merging the first protruding fluid droplet and the second protruding fluid droplet together in a droplet-to-droplet connection.

18. A method according to Claim 17, in which the first protruding fluid droplet protrudes downward from the first mating surface and the second protruding fluid droplet protrudes upward from the second mating surface.

19. A method according to Claim 17, in which the first protruding fluid droplet protrudes upward from the first mating surface and the second protruding fluid droplet protrudes downward from the second mating surface.

20. An assembly, comprising:

(a) a first substrate comprising a first stable droplet protruding from a first fluidic port and a guide mechanism;

(b) a second substrate in contact with the first substrate and comprising a second stable droplet protruding from a second fluidic port, in which the first and second stable droplets are aligned so as to permit fluidic communication;

(c) a carrier supporting the second substrate and comprising a portion engaging the guide mechanism; and

(d) a pressurized fluid source in fluidic communication with the first fluidic port.

21. An assembly according to Claim 20, in which the carrier further comprises a retention mechanism for retaining the contact between the first and second substrates.

22. An assembly according to Claim 20, in which the guide mechanism comprises a guide track.