CLAIMS

1. A system for fluid processing, comprising:

an input well;

an output well;

a channel component including (a) a plate including a bottom surface at which the plate is attached to each of the wells, and a top surface having a substantially horizontal microchannel formed therein, (b) a substantially vertical input tube projecting into the input well from the bottom surface of the plate, and (c) a cover attached to the top surface of the plate and providing a top wall of the microchannel; and

at least one vacuum/pressure source operatively connected to the channel component;

wherein the system is configured to receive a sample-containing fluid in the input well such that the sample-containing fluid is in contact with a bottom end of the input tube and is retained, with assistance from gravity, out of contact with the microchannel until a pressure differential is created with the at least one vacuum/pressure source that drives at least a portion of the sample-containing fluid from the input well via the input tube, and through the microchannel, and into the output well.

2. The system of claim **1**, wherein the input well and the output well are formed integrally with one another and separately from the plate and the input tube.

3. The system of claim **1**, wherein the plate and the input tube are formed integrally with one another.

4. The system of claim **1**, further comprising a source of carrier fluid disposed in fluid communication with the microchannel.

5. The system of claim **4**, the microchannel being a first microchannel, wherein the channel component further includes one or more other substantially horizontal microchannels that meet the first microchannel at a channel intersection, and wherein the system is configured to create a pressure differential with the at least one vacuum/pressure source that drives at least a portion of the sample-containing fluid and at least a portion of the carrier fluid to the channel intersection, such that droplets including the sample-containing fluid and disposed in the carrier fluid are formed at the channel intersection and collected in the output well.

6. The system of claim **5**, further comprising at least one well component attached to the channel component and providing a plurality of input wells including the input well and a plurality of output wells including the output well, wherein the system is configured to create a pressure differential that causes the channel component to form a plurality of emulsions from the carrier fluid and at least one sample-containing fluid disposed in the plurality of input wells, and to direct the plurality of emulsions to the plurality of output wells.

7. The system of claim **6**, wherein the channel component further includes a manifold that supplies the same carrier fluid for each emulsion.

8. The system of claim **5**, wherein the channel component further includes a carrier port connected to the channel intersection and configured to receive carrier fluid from the source of carrier fluid, and wherein the carrier fluid is configured to enter the carrier port from above the channel component in response to a pressure differential created by the at least one vacuum/pressure source.

9. The system of claim **3**, wherein the plate and the input tube are formed separately from each of the wells.

10. The system of claim **1**, wherein the channel component further includes a sample port located directly over the input well and extending through the plate and the cover, and wherein the sample port communicates with the input well separately from the input tube.

11. The system of claim **1**, wherein the channel component further includes at least one port covered by the cover and configured to be accessed by piercing the cover.

12. The system of claim **1**, wherein the at least one vacuum/pressure source includes a vacuum source.

13. The system of claim **12**, wherein the at least one vacuum/pressure source includes a source of positive pressure.

14. A system for fluid processing, comprising:

an input well;

an output well;

a channel component having a bottom side that is affixed to and abutted with each of the wells, the channel component including a substantially horizontal microchannel and also including a substantially vertical input tube projecting into the input well; and

at least one vacuum/pressure source operatively connected to the channel component;

wherein the system is configured to receive a sample-containing fluid in the input well such that the sample-containing fluid is in contact with a bottom end of the input tube and is retained, with assistance from gravity, out of contact with the microchannel until a pressure differential is created with the at least one vacuum/pressure source that drives at least a portion of the sample-containing fluid from the input well via the input tube, through the microchannel, and into the output well.

15. The system of claim **14**, wherein the channel component includes a plate having a top surface in which the microchannel is formed, and wherein the channel component also includes a cover providing a top wall of the microchannel.

16. The system of claim **15**, wherein the plate and the input tube are formed integrally with one another.

17. The system of claim **14**, wherein the input well and the output well are formed integrally with one another and separately from the channel component.

18. The system of claim **14**, further comprising a source of carrier fluid disposed in fluid communication with the microchannel.

19. The system of claim **18**, the microchannel being a first microchannel, wherein the channel component further includes one or more other substantially horizontal microchannels that meet the first microchannel at a channel intersection, and wherein the system is configured to create a pressure differential with the at least one vacuum/pressure source that drives at least a portion of the sample-containing fluid and at least a portion of the carrier fluid to the channel intersection, such that droplets including the sample-containing fluid and disposed in the carrier fluid are formed at the channel intersection and collected in the output well.

20. A system for fluid processing, comprising:

at least one well component providing an input well and an output well;

a channel component including a plurality of substantially horizontal microchannels that meet one another at a channel intersection, the channel component having a bottom side that is affixed to and abutted with the at least one well component, and also having a substantially vertical input tube projecting into the input well and disposed in fluid communication with the channel intersection;

at least one vacuum/pressure source operatively connected to the channel component; and

a source of carrier fluid disposed in fluid communication with the channel intersection;

wherein the system is configured to receive a sample-containing fluid in the input well such that the sample-containing fluid is in contact with a bottom end of the input tube and is retained, with assistance from gravity, out of the plurality of microchannels until a pressure differential is created with the at least one vacuum/pressure source that drives at least a portion of the sample-containing fluid from the input well via the input tube to the channel intersection, and that drives at least a portion of the carrier fluid to the channel intersection, such that droplets including the sample-containing fluid and disposed in the carrier fluid are formed at the channel intersection and collected in the output well.