suitable structure **45** that forms a flow area **46** to contain or direct the transfer of a fluid within the micro fluidic chamber **40**. Such a structure **45** can be a silicon substrate, membrane or any suitable structure. With reference to **FIG. 13** is noted that the present invention allows for the controlled movement of magnetic particles without a fluid flow channel. For example, an open surface provided with the array of magnetic traps **1** and the magnetic random access memory chip **41** of **FIG. 13** (or any suitable control of the individual traps) would allow one to selectively turn "OFF" a magnet trap holding a particle and turn "ON" adjacent magnetic traps in sequence to move the particle around as desired. This eliminates the need for the type of fluid flow that is the basis of micro flow channel technology.

[0078] Although the present invention has been described with reference to particular means, materials and embodiments, from the foregoing description, one skilled in the art can easily ascertain the essential characteristics of the present invention and various changes and modifications can be made to adapt the various uses and characteristics without departing from the spirit and scope of the present invention as described above and in the attached claims.

What is claimed is:

1. A microfluidic platform for selectively manipulating magnetic particles which comprises:

a substrate supporting a membrane; and

a plurality of magnetic traps attached to the membrane, the plurality of magnetic traps configured to produce a local magnetic field when subjected to an applied magnetic field which local magnetic field is capable of attracting and restraining magnetic particles near the magnetic traps.

2. A microfluidic platform for selectively capturing and releasing magnetic particles according to claim 1, wherein the material that produces a local magnetic field comprises a high moment low remnant field material.

3. A microfluidic platform for selectively capturing and releasing magnetic particles according to claim 1, wherein the material that produces a local magnetic field and has a high moment low remnant field is Permalloy.

4. A microfluidic platform for selectively capturing and releasing magnetic particles according to claim 1, wherein the plurality of magnetic traps each comprise a multilayered spin-valve structure comprising two discrete magnetic layers of a material that together can selectively have either parallel or anti-parallel magnetic moments when subjected to an applied magnetic field or current pulse to produce a local magnetic field that is capable of attracting and restraining and subsequently releasing magnetic particles near the magnetic traps.

5. A microfluidic platform for selectively capturing and releasing magnetic particles according to claim 1, wherein the plurality of magnetic traps each comprise a multilayered spin-valve structure having two discrete magnetic layers encased in a multiple layer structure that together can selectively have either parallel or anti-parallel magnetic moments when subjected to an applied magnetic field or current pulse to produce in total a local magnetic field that is capable of attracting and restraining and subsequently releasing magnetic particles near the magnetic traps.

6. A microfluidic platform for selectively capturing and releasing magnetic particles according to claim 1, wherein the plurality of magnetic traps each comprise a multilayered spin-valve structure having the following sequence of layers: a layer of tantalum, a layer of Permalloy, a layer of cobalt, a layer of copper, a layer of cobalt, a layer of Permalloy, a layer of IrMn and a layer of tantalum, wherein the layers of Permalloy can selectively have either parallel or anti-parallel magnetic moments when subjected to an applied magnetic field or current pulse to produce in total a local magnetic field that is capable of attracting and restraining and subsequently releasing magnetic particles near the magnetic traps.

7. A microfluidic platform for selectively capturing and releasing magnetic particles according to claim 1, wherein the plurality of magnetic traps are arranged in an array and are sized to attract and restrain individual cells, molecules, or polymers that are magnetically tagged.

8. A microfluidic platform for selectively capturing and releasing magnetic particles according to claim 1, wherein the membrane is transparent.

9. A method of manipulating magnetic particles which comprises:

providing a plurality of magnetic particles;

dispersing the magnetic particles in a fluid;

providing an array of magnetic traps which comprise discrete substantially coplanar layers of a material that, when subjected to an applied magnetic field produces a local magnetic field that is capable of attracting and restraining magnetic particles near the magnetic traps;

applying a magnetic field to each magnetic trap; and

bringing the fluid having the magnetic particles dispersed therein near the array of magnetic traps so that at least some of the magnetic particles are held by the local magnetic fields of some of the traps.

10. A method of manipulating magnetic particles according to claim 9, wherein the magnetically tagged particles are at least one of biological species, cells, molecules, and polymers.

11. A method of manipulating magnetic particles according to claim 9, wherein the array of magnetic traps are attached to a membrane that is supported by a substrate.

12. A method of manipulating magnetic particles according to claim 9, wherein the coplanar layers of material that produce the local magnetic field comprises a high moment low remnant field material.

13. A method of manipulating magnetic particles according to claim 9, wherein the material that produces a local magnetic field and has a high moment low remnant field is Permalloy.

14. A method of manipulating magnetic particles according to claim 9, wherein each of the magnetic traps comprise a multilayered spin-valve structure having two discrete magnetic layers encased in a multiple layer structure that together can selectively have either parallel or anti-parallel magnetic moments when subjected to an applied magnetic field or current pulse to produce in total a local magnetic field that is capable of attracting and restraining and subsequently releasing magnetic particles near the magnetic traps.

15. A method of manipulating magnetic particles according to claim 9, wherein each of the magnetic traps comprise a multilayered spin-valve structure having two discrete magnetic layers encased in a multiple layer structure that together can selectively have either parallel or anti-parallel