What is claimed is:

1. A microfluidic device, comprising:

a channel;

a fluid inlet to pass fluid into the channel from a reservoir;

a sensor disposed in the channel; and

a pump actuator disposed in the channel apart from the sensor to induce fluid flow into the channel;

wherein the channel includes a primary channel and a secondary channel, the secondary channel having a secondary inlet and a secondary outlet in fluidic communication with the primary channel, and wherein the sensor is disposed in the secondary channel; and a filter is disposed in the secondary inlet and the secondary outlet.

2. The microfluidic device of claim 1, further comprising:

an other filter disposed in the fluid inlet to filter particles from the fluid.

3. The microfluidic device of claim 1, wherein the pump actuator ejects fluid from the channel to induce the fluid flow.

4. The microfluidic device of claim 1, further comprising:

an outlet to pass fluid from the channel to the reservoir.

~~5. The microfluidic device of claim 1, wherein the channel includes a primary channel and a secondary channel, the secondary channel having a secondary inlet and a secondary outlet in fluidic communication with the primary channel, and wherein the sensor is disposed in the secondary channel.~~

~~6. The microfluidic device of claim 5, further comprising:~~

~~filters disposed in the secondary inlet and the secondary outlet.~~

5~~7~~. A microfluidic sensor device, comprising:

a substrate;

a fluid reservoir;

an electrical interface; and

a microfluidic structure in fluidic communication with the fluid reservoir and electrical communication with the electrical interface, the microfluidic structure having a channel, an electrical sensor, and a pump actuator to induce fluid flow into the channel over the electrical sensor;

wherein the channel includes a primary channel and a secondary channel, the secondary channel having a secondary inlet and a secondary outlet in fluidic communication with the primary channel, and wherein the sensor is disposed in the secondary channel; and a filter is disposed in the secondary inlet and the secondary outlet.

68. The microfluidic sensor device of claim 57, wherein the electrical sensor is an impedance sensor for detecting impedance changes as particles in the fluid flow through the channel.

79. The microfluidic sensor device of claim 57, wherein the pump actuator induces fluid flow in the channel by ejecting the fluid from the channel.

810. The microfluidic sensor device of claim 57, wherein the pump actuator induces fluid flow in the channel by recirculating the fluid back to the fluid reservoir.

~~11. The microfluidic sensor device of claim 7, wherein the channel includes a primary channel and a secondary channel, the secondary channel in fluidic communication with the primary channel.~~

~~12~~9. A diagnostic sensor system, comprising:

a sensor device module having a fluid reservoir, a microfluidic device, and an electrical interface, the microfluidic device being in fluidic communication with the fluid reservoir and electrical communication with the electrical interface; and

an electronic controller module detachably coupled to the sensor device module, the electronic controller module including an electronic controller in electrical communication with the microfluidic device through the electrical interface;

wherein the microfluidic device includes

a channel,

an impedance sensor disposed in the channel,

and a pump actuator disposed in the channel to induce fluid flow into the channel,

the channel including a primary channel and a secondary channel, the secondary channel having a secondary inlet and a secondary outlet in fluidic communication with the primary channel, and wherein the sensor is disposed in the secondary channel; and a filter is disposed in the secondary inlet and the secondary outlet.

103. The diagnostic sensor system of claim 912, wherein the electronic controller includes an interface to a host device.

~~14. The diagnostic sensor system of claim 12, wherein the microfluidic device includes a channel, an impedance sensor disposed in the channel, and a pump actuator disposed in the channel to induce fluid flow into the channel.~~

~~15. The diagnostic sensor system of claim 14, wherein the channel includes a primary channel and a secondary channel, the secondary channel in fluidic communication with the primary channel.~~