CLAIMS:

1. A wearable physiological monitoring device comprising:

at least one sensor for measuring a physiological parameter of a user;

an acoustic sensor for receiving an acoustic signal;

a pre-processor operable to receive data from the at least one sensor and the acoustic sensor;

a main processor being a separate processing unit from the pre-processor, the preprocessor receiving output from the at least one sensor and the acoustic sensor and performing a basic screening algorithm on signals from the at least one sensor and the acoustic sensor to detect an event of interest as a screened signal, the basic screening algorithm eliminating, in the screened signal, the signals from the at least one sensor and the acoustic sensor that fail to meet predetermined criteria for detecting the event of interest;

a buffer/memory for storing the screened signals,

wherein the stored screened signals are periodically processed by a main processor algorithm of the main processor after a predetermined period of time or after a predetermined memory count to verify that the screened signals include the event of interest, the main processor algorithm operating at greater accuracy for detecting the event of interest than the basic screening algorithm; and

a main memory stores a processed signal processed by the main processor;

wherein the pre-processor operates at a first power consumption level and the main processor operates at a second power level, greater than the first power level; and

wherein the at least one sensor, the acoustic sensor, the main processor and the preprocessor are integrated into a single wearable device.

2. The device of claim 1, wherein the at least one sensor includes at least two distinct sensors arranged in a sensor array.

3. The device of claim 2, wherein at least one of the at least two distinct sensors is a motion sensor.

4. The device of claim 1, further comprising a data communication module for sending data or an alert to an external device.

5. The device of claim 4, wherein the data communication module operates periodically or as required to send an alert.

6. The device of claim 1, wherein the device performs real-time, continuous monitoring measured in whole days.

7. The device of claim 1, wherein the acoustic signals are detected and recorded directly from a surface of the user between a waist and a base of a neck of the user.

8. The device of claim 1, wherein the acoustic sensor is embedded in a protective layer that facilitates sound transfer through a housing of the device.

9. The device of claim 8, wherein the housing includes one or more regions having a reduced thickness as compared to the remainder of the housing to permit flexing thereof when attached to the user.

10. The method of claim 1, wherein the signals from the at least one sensor and the acoustic sensor that fail to meet predetermined criteria for detecting the event of interest are those that have less than 50% to 80% resemblance to sensor data that is relevant for detecting the event of interest.

11. A wearable respiratory and physiological monitoring device comprising:
at least two distinct sensors for measuring physiological parameters of a user;
an acoustic sensor for receiving an acoustic signal;

a pre-processor for performing a basic screening algorithm of a signal from the at least two distinct sensors and the acoustic sensor to form a pre-processed signal, the basic screening algorithm eliminating, in the pre-processed signal, the signal from the at least two distinct sensors and the acoustic sensor that fails to meet predetermined criteria for detecting an event of interest;

a buffer/memory for storing the pre-processed signal; and

a main processor operating periodically for analyzing data received from the buffer/memory and comparing the measured physiological parameters to a user's baseline, wherein:

the pre-processor is a separate processing unit from the main processor, the pre-processor receiving output from the at least two distinct sensors and the acoustic sensor;

the stored pre-processed signal is periodically processed by a main processor algorithm by the main processor after a predetermined period of time or after a predetermined memory count to verify that the pre-processed signal includes the event of interest, the main processor algorithm operating at greater accuracy for detecting the event of interest than the basic screening algorithm;

a resultant signal processed by the main processor is stored in a main memory; and

the pre-processor operates at a first power consumption level and the main processor operates at a second power level, greater than the first power level.

12. The device of claim 11, further comprising a data communication module for sending data or an alert to an external device.

13. The device of claim 12, wherein the data communication module operates periodically or as required to send an alert.

14. The device of claim 11, wherein the device performs real-time, continuous monitoring measured in whole days.

15. A method for measuring physiological parameters of a user, comprising:

disposing a wearable on a user;

measuring at least one physiological parameter of the user with at least one sensor;

measuring an acoustic signal from the user with an acoustic sensor;

analyzing data received from the at least one sensor and the acoustic sensor with an integrated processor, the integrated processor including a pre-processor and a main processor, the pre-processor being a separate processing unit from the main processor, the pre-processor receiving output from the at least one sensor and the acoustic sensor, and wherein the step of analyzing data received from the at least one sensor and the acoustic sensor with an integrated processor includes performing a basic screening algorithm with the pre-processor to detect events of interest from the data received from the at least one sensor and the acoustic sensor, and storing a processed signal that results from the basic screening algorithm detecting the events of interest in a memory/buffer, the basic screening algorithm eliminating, in the processed signal, the signal from the at least one sensor and the acoustic sensor that fail to meet predetermined criteria for detecting the event of interest-, and wherein the at least one sensor, the acoustic sensor, the main processor and the pre-processor are integrated into the wearable; and

comparing the measured physiological parameters to a user's baseline, wherein the pre-processor operates at a first power consumption level and the main processor operates at a second power level, greater than the first power level; and

the step of analyzing data received from the at least one sensor and the acoustic sensor with an integrated processor includes periodically processing the processed signal by a main processor algorithm in the main processor after a predetermined period of time or after a predetermined memory count and saving a resulting signal processed by the main processor in a main memory, the main processor algorithm verifying that the pre-processed signal includes the event of interest, the main processor

algorithm operating at greater accuracy for detecting the event of interest than the basic screening algorithm.

16. The method of claim 15, further comprising sending data or an alert to an external device with a data communication module, the data communication module operating periodically or as required to send an alert.

17. The method of claim 15, wherein the event of interest is a cough of the user and the method further comprises analyzing the acoustic signal and a motion sensor of the wearable.