CLAIMS

What is claimed is:

1. A wearable apparatus for wearing on a head of a user, the apparatus comprising:

a band assembly comprising:

a flexible band member comprising band ends joined by a curved band portion of a curve generally shaped to correspond to the user's forehead;

at least one bio-signal sensor disposed inwardly along the curved band portion to provide a flexible conductive surface;

a biasing component to urge the at least one bio-signal sensor towards the user's forehead when worn by the user;

a conformable earpiece connected to one of the band ends of the flexible band member comprising a hollow area to ~~secure the wearable apparatus to a back of the user's ear~~form around the back of an ear of the user, wherein at least a portion of the conformable earpiece is made of conductive material to provide at least one additional bio-signal sensor in contact with the ear or mastoid bone region of the user;

at least one computer system connected to the at least one bio-signal sensor and the at least one additional bio-signal sensor to receive bio-signal data to determine a brain state of the user, the at least one computer system having at least one computer, at least one (non-transitory) computer readable medium (memory) including processing instructions for the computer processor to process the brainwave data, and at least one communication subsystem for communicating the processed bio-signal data to an external computing device.

2. The wearable apparatus of claim 1 wherein the at least one bio-signal sensor comprises at least a central brainwave sensor at a centre portion of the curved band portion and two outer brainwave sensors, each of the outer brainwave sensors arranged on a respective side of the central brainwave sensor.

3. The wearable apparatus of claim 1 wherein the conformable earpiece has a wrap portion to wrap a contact portion under the user's ear.

4. The wearable apparatus of claim 1 wherein the conformable earpiece is a depressible or deformable earpiece.

5. The wearable apparatus of claim 1, further comprising at least one adjustable component connecting the band assembly to the conformable earpiece, at least one adjustable component being extendable or retractable in relation to the at least one earpiece to extend or retract a length of the band assembly.

6. The wearable apparatus of claim 1 wherein the at least one computer system is connected to the at least one bio-signal sensor and the at least one additional bio-signal sensor by communication wires integrated into the band assembly.

7. The wearable apparatus of claim 1 wherein the at least one computer system has a port for connecting the wearable apparatus to a power source for charging or for interfacing the wearable apparatus with another computing device or additional elements electrical elements.

8. The wearable apparatus of claim 1 wherein the conformable earpiece comprises a conductive ear contact to support the wearable apparatus on the head and provide conductivity from the at least one additional bio-signal sensor.

9. The wearable apparatus of claim 1 wherein the conformable earpiece has a bottom portion being a contact portion having the at least one additional bio-signal sensor, the bottom portion having a front edge and a bottom edge, the front edge shaped to form to the user's ear, the bottom edge being shaped to wrap under the user's ear.

10. The wearable apparatus of claim 1, wherein the at least one bio-signal sensor and the additional bio-signal sensor comprises a reference sensor providing a reference measurement for other bio-signal measurements, a Driven Right Leg sensor to reduce noise of the reference measurement, at least two sensors for

providing EEG channel measurements at FP1 and FP2 locations, and at least two sensors for providing EEG channel measurements at TP9 and TP12 locations.

11. The wearable apparatus of claim 10, wherein the reference sensor is a central brainwave sensor providing the reference measurement.

12. The wearable apparatus of claim 9, wherein the at least one conformable earpiece is removable from the wearable apparatus and comprises a mushroom head with an attachment device that mates with a corresponding attachment device of the wearable apparatus.

13. The wearable apparatus of claim 1, wherein the conformable earpiece comprises a mechanical holding on the back to tighten the band assembly.

14. The wearable apparatus of claim 1, wherein the band assembly is stretchable to adjust the curve of the curved band portion.

15. The wearable apparatus of clam 1, further comprising a flexible conductive coating on the conformable earpiece to provide the at least one additional brainwave sensor.

16. The wearable apparatus of claim 1, wherein the at least one bio-signal sensor has a conductive coating that connects to a flexible circuit in the computer system.

17. The wearable apparatus of claim 1, wherein the at least one bio-signal sensor comprises a hydrogel that has been hydrated with a conductive solution.

18. The wearable apparatus of claim 1, wherein the band member provides a stretch headband.

19. The wearable apparatus of claim 1, further comprising a semi-rigid attachment with the at least one bio-signal sensor being attachable to the headband at a plurality of locations.

20. The wearable apparatus of claim 1, wherein the conformable earpiece has a receiving slot to receive the band member and has an attachment component to secure the band member at a plurality of positions.

21. The wearable apparatus of claim 1, wherein the conformable earpiece ~~conforms to urge the additional bio-signal sensor toward the user's ear or mastoid region when worn by the user~~further comprises a mechanical holding of the earpiece configured to deform to hook onto the ear of the user and allow the headband to tighten on the head.