WHAT IS CLAIMED IS:

1. An implantable sensor device (130) comprising:

a sensor-support substrate (131);

a microelectromechanical systems (MEMS) pressure sensor device (132) mounted to the sensor-support substrate;

a transduction medium (134) applied over the pressure sensor device; ~~and~~

a biocompatibility layer (135) applied over the transduction medium;

an oxide layer (137) formed on a surface of the biocompatibility layer; and

an organic film (138) bonded to the oxide layer.

2. The implantable sensor device of claim 1, further comprising one or more bondwires (133) electrically coupled to the pressure sensor device~~.~~,

~~3. The implantable sensor device of claim 2,~~ optionally wherein:

a) the transduction medium covers at least a portion of the one or more bondwires~~.~~; and/or

~~4. The implantable sensor device of claim 2 or claim 3, wherein~~ b) the sensor-support substrate includes one or more through-holes (105) through which at least one of the one or more bondwires pass to a backside of the sensor-support substrate.

~~5. The implantable sensor device of any of claims 1 through 4, wherein the transduction medium comprises parylene.~~

~~6. The implantable sensor device of any of claims 1 through 5, wherein the transduction medium comprises silicone.~~

~~7. The implantable sensor device of any of claims 1 through 6, wherein the transduction medium comprises epoxy.~~

3~~8~~. The implantable sensor device of any of claims 1 ~~through 7~~or 2, wherein the transduction medium has:

a) a non-conformal top surface~~.~~; or

~~9. The implantable sensor device of any of claims 1 through 8, wherein the transduction medium has~~ b) a conformal surface conforming to a form of the pressure sensor device.

4~~10~~. The implantable sensor device of any of claims 1 through 3~~9~~, wherein:

a) the biocompatibility layer comprises a metal film~~.~~;

~~11. The implantable sensor device of any of claims 1 through 10, further comprising an oxide layer formed on a surface of the biocompatibility layer.~~

~~12. The implantable sensor device of claim 11, further comprising an organic film bonded to the oxide layer.~~

~~13. The implantable sensor device of claim 12, wherein~~ b) the organic film is covalently bonded to the oxide layer~~.~~; and/or

~~14. The implantable sensor device of claim 12 or claim 13, wherein~~ c) the organic film comprises at least one of polyethylene glycol, a long-chain organic acid, a protein, or a carbohydrate.

5~~15~~. The implantable sensor device of any of claims 1 through 4~~14~~, wherein:

a) the sensor-support substrate comprises metal~~.~~; and/or

~~16. The implantable sensor device of any of claims 1 through 15, wherein~~ b) the pressure sensor device, the transduction medium, and/or biocompatibility layer are disposed at least partially within sidewalls (154) that are mechanically coupled to the sensor-support substrate.

6~~17~~. A method of packaging a pressure sensor device, the method comprising:

providing a microelectromechanical systems (MEMS) pressure sensor device mounted to a sensor-support substrate;

applying a transduction medium over the pressure sensor device; ~~and~~

applying a biocompatibility layer over the transduction medium;

forming an oxide layer on a surface of the biocompatibility layer; and

bonding an organic film to the oxide layer.

7~~18~~. The method of claim 6~~17~~, wherein:

a) said applying the transduction medium comprises covering the pressure sensor device and at least a portion of one or more bondwires electrically coupled to the pressure sensor device with the transduction medium~~.~~,

~~19. The method of claim 17 or claim 18, wherein the transduction medium comprises parylene.~~

~~20. The method of any of claims 17 through 19, wherein the transduction medium comprises silicone.~~

~~21. The method of claims 17 through 20, wherein the transduction medium comprises epoxy.~~

~~22. The method of claims 17 through 21,~~optionally wherein the transduction medium has a non-conformal top surface~~.~~;

~~23. The method of claims 17 through 22, wherein~~ b) said applying the transduction medium comprises forming a conformal layer of the transduction medium over the pressure sensor device and at least a portion of the sensor-support substrate~~.~~; and/or

~~24. The method of claims 17 through 23, wherein~~ c) said applying the biocompatibility layer comprises sputtering a titanium film onto the transduction medium.

~~25. The method of claims 17 through 24, further comprising forming an oxide layer on a surface of the biocompatibility layer.~~

~~26. The method of claim 25, further comprising bonding an organic film to the oxide layer.~~

8~~27~~. A pressure sensor assembly (100) comprising:

a metal can structure (150) including a base (151) and one or more sidewalls (154);

a microelectromechanical systems (MEMS) pressure sensor device (120) mounted to the base of the metal can structure;

a printed circuit board (160) electrically coupled to the pressure sensor device via one or more through-holes (153) in the base of the metal can structure;

a coil antenna (108) electrically coupled to the printed circuit board;

a rigid tube (170) encapsulating at least a portion of the printed circuit board and the coil antenna, the rigid tube being mechanically secured to the metal can structure;

a transduction medium (134) applied over the pressure sensor device within the one or more sidewalls of the metal can structure; ~~and~~

a biocompatibility layer (159) applied over the transduction medium;

an oxide layer (137) formed on a surface of the biocompatibility layer; and

an organic film (138) bonded to the oxide layer.

~~28. The pressure sensor assembly of claim 27, wherein the transduction medium comprises parylene.~~

~~29. The pressure sensor assembly of claim 27 or claim 28, wherein the transduction medium comprises silicone.~~

~~30. The pressure sensor assembly of any of claims 27 through 29, wherein the transduction medium comprises epoxy.~~

9~~31~~. The pressure sensor assembly of ~~any of~~ claim~~s~~ 8~~27 through 30~~, wherein the transduction medium has:

a) a non-conformal top surface~~.~~; or

~~32. The pressure sensor assembly of any of claims 27 through 31, wherein the transduction medium has~~ b) a conformal surface conforming to forms of the pressure sensor device.

10~~33~~. The pressure sensor assembly of any of claims 8 or 9~~27 through 32~~, wherein the biocompatibility layer comprises a metal film.

~~34. The pressure sensor assembly of any of claims 27 through 33, further comprising an oxide layer formed on a surface of the biocompatibility layer.~~

~~35. The pressure sensor assembly of claim 34, further comprising an organic film bonded to the oxide layer.~~11~~36~~. A pressure sensor assembly (200) comprising:

a printed circuit board (260) ;

a wireless transmitter (208) electrically coupled to the printed circuit board;

a rigid tube (270) encapsulating at least a portion of the printed circuit board and the wireless transmitter, the rigid tube having first and second ends (294, 295);

a microelectromechanical systems (MEMS) pressure sensor device (220) mounted to an end portion (291) of the printed circuit board that extends axially beyond the first end of the rigid tube;

a transduction medium (234) that covers the printed circuit board, the wireless transmitter, and the pressure sensor device, the transduction medium filling the rigid tube and projecting axially beyond the first end of the rigid tube over the end portion of the printed circuit board; ~~and~~

a biocompatibility layer (237, 239) applied over the first and second ends of the rigid tube and over portions of the transduction medium associated with the first and second ends of the rigid tube, respectively;

an oxide layer (137) is formed on a surface of the biocompatibility layer; and

an organic film (138) bonded to the oxide layer.

13~~37~~. The implantable sensor device of any of claims 1 to 5, the method of claim 6 or claim 7, the pressure sensor assembly of any of claims 8 to 10 or the pressure sensor assembly of claims 11 or 12 ~~36~~, wherein the transduction medium comprises parylene~~.~~, ~~38. The pressure sensor assembly of claim 36 or claim 37, wherein the transduction medium comprises~~ silicone~~.~~, and/or ~~39. The pressure sensor assembly of any of claims 36 through 38, wherein the transduction medium comprises~~ epoxy.

12~~40~~. The pressure sensor assembly of ~~any of~~ claim~~s~~ 11~~36 through 39,~~;

a) further comprising a polymer layer applied over at least a portion of the biocompatibility layer~~.~~; and/or

~~41. The pressure sensor assembly of any of claims 36 through 40,~~ b) wherein the biocompatibility layer comprises alternating layers of polymer (136) and metal (135)~~.~~,

~~42. The pressure sensor assembly of claim 41,~~ optionally wherein the alternating layers of polymer and metal comprise at least two layers of metal and at least two layers of polymer.

~~43. The pressure sensor assembly of any of claims 36 through 42, further comprising an oxide layer is formed on a surface of the biocompatibility layer.~~

~~44. The pressure sensor assembly of claim 43, further comprising an organic film bonded to the oxide layer.~~

1445. ~~An~~The implantable sensor device comprising of any of claims 1 to 5~~:~~, wherein

~~a sensor-support substrate;~~

~~a microelectromechanical systems (MEMS) pressure sensor device mounted to the sensor-support substrate;~~

~~a transduction medium applied over the pressure sensor device; and~~

~~a biocompatibility layer applied over the transduction medium,~~ the biocompatibility layer comprising alternating sublayers of metal film (135a, 135b) and polymer film (136a, 136b)~~.~~,

~~46. The implantable sensor device of claim 45,~~ optionally wherein the alternating sublayers of metal film and polymer film comprise: a) at least two sublayers of metal film and at least two sublayers of polymer film~~.~~;

~~47. The implantable sensor device of claim 46, wherein the alternating sublayers of metal film and polymer film comprise~~ b) at least ten film sublayers~~.~~; or

~~48. The implantable sensor device of claim 47, wherein the alternating sublayers of metal film and polymer film comprise~~ c) at least twelve film sublayers.

1549. The implantable sensor device of ~~any of~~ claim~~s~~ 1445 ~~through 48~~, wherein:

a) at least some sublayers of the biocompatibility layer have a thickness of about 1 µm or less~~.~~;

~~50. The implantable sensor device of any of claims 45 through 49, wherein~~ b) the biocompatibility layer has a thickness of about 10 µm or less~~.~~; and/or

~~51. The implantable sensor device of any of claims 45 through 50, wherein~~ c) bottom and top sublayers of the biocompatibility layer are metal film sublayers.