

WHAT IS CLAIMED IS:

1. An expandable device for implanting within vasculature, comprising:
 - a central core comprising a number of struts that form a number of cells, the cells forming a circumference encircling the central core;
 - wherein the central core is capable of expanding from an unexpanded state radially outward to an expanded state;
 - wherein when the central core is in an expanded state, the central core has a controlled inner diameter; and
 - a plurality of appendages that extend away from the central core, each appendage is formed by at least one strut and is independent from the other appendages;
 - wherein each appendage is capable of independently expanding from an unexpanded state radially outward to an expanded state such that an apex of each appendage extends radially outward beyond an outer circumference of the central core.
2. The expandable device as in claim 1, wherein the controlled inner diameter of the central core in the expanded state is between 15 and 35 mm.
3. The expandable device as in claim 1 or 2, wherein the controlled inner diameter of the central core in the expanded state is: 15mm, 16mm, 17mm, 18mm, 19mm, 20mm, 21mm, 22mm, 23mm, 24mm, 25mm, 26mm, 27mm, 28mm, 29mm, 30mm, 31mm, 32mm, 33mm, 34mm, or 35mm.
4. The expandable device as in claim 1, 2, or 3, wherein the length of the central core is longer in the unexpanded state as compared to an expanded state.
5. The expandable device as in any of claims 1-4, wherein a width or thickness of at least one strut varies.
6. The expandable device as in any of claims 1-5, wherein at least one appendage is formed by a single strut.
7. The expandable device as in any of claims 1-6, wherein at least one

appendage is formed by at least two struts that connect at the apex of the appendage.

8. The expandable device as in any of claims 1-7, wherein at least one appendage forms a V-shape.

9. The expandable device as in any of claims 1-8, wherein at least one appendage forms a Y-shape.

10. The expandable device as in any of claims 1-9, wherein at least one appendage has an orifice at the apex.

11. The expandable device as in any of claims 1-10, wherein at least one appendage has a hook at the apex.

12. The expandable device as in any of claims 1-11 further comprising a radiopaque portion within the central core or an appendage.

13. The expandable device as in any of claims 1-12, wherein the central core and appendages are made of a high radial strength material.

14. The expandable device as in claim 13, where the high radial strength material is cobalt chromium or stainless steel.

15. The expandable device as in any of claims 1-12, wherein the central core and appendages are made of a self-expanding material.

16. The expandable device as in claim 15, where the self-expanding material is nitinol.

17. The expandable device as in any of claims 1-16, wherein a cover is incorporated within the central core.

18. The expandable device as in claim 17, the cover is secured to the struts

of the central.

19. The expandable device as in claim 17 or 18, the cover is impermeable to blood.

20. The expandable device as in any of claims 17, 18, or 19, wherein the cover is a biocompatible fabric.

21. The expandable device as in any of claims 17, 18, or 19, wherein the cover is a bioprosthetic tissue.

22. The expandable device as in any of claims 17-21, wherein the cover is further incorporated within the plurality of appendages and includes sealing portions that are capable of engaging an inner wall at a site of deployment.

23. The expandable device as in any of claims 1-22, wherein the central core is configured to engage a prosthesis.

24. The expandable device as in any of claims 1-23, wherein the central core includes a valve seat configured to situate a prosthetic valve.

25. The expandable device as in claim 24, wherein the outer perimeter of the prosthetic valve is compatible with the inner perimeter of the central core.

26. The expandable device as in claims 24 or 25, wherein the outer diameter of the prosthetic valve is between 15mm and 35mm.

27. The expandable device as in claims 24, 25, or 26, wherein the outer diameter of the prosthetic valve is: 15mm, 16mm, 17mm, 18mm, 19mm, 20mm, 21mm, 22mm, 23mm, 24mm, 25mm, 26mm, 27mm, 28mm, 29mm, 30mm, 31mm, 32mm, 33mm, 34mm, or 35mm.

28. The expandable device as in any of claims 1-27, wherein, when the central core and the plurality of appendages are in a crimped state, the central core

and the plurality of appendages are configured to be inserted within a catheter.

29. The expandable device as in any of claims 1-28, wherein, when in the expanded state, the apex of each appendage is capable of engaging an inner wall at a site of deployment.

30. The expandable device as in claim 29, wherein the inner wall is a luminal wall of a vasculature.

31. The expandable device as in claim 30, wherein the vasculature at the site of deployment is dilated.

32. The expandable device as in claim 31, wherein the vasculature at the site of deployment is experiencing an aneurysm.

33. A method of implanting an expandable device, the method comprising:
delivering to a site of deployment an expandable device, the expandable device comprising a central core and a plurality of appendages that extend away from the central core;

wherein the central core comprises a number of struts that form a number of cells, the cells forming a circumference encircling the central core;

wherein each appendage is formed by at least one strut and is independent from the other appendages;

wherein the expandable device is delivered in an unexpanded state; and
expanding the expandable device from the unexpanded state into an expanded state such that the central core is expanded to a controlled inner diameter and each apex of each appendage of the plurality of appendages expands beyond the outer circumference of the central core.

34. The method as in claim 33, wherein the controlled inner diameter of the central core in an expanded state is between 15 and 35 mm.

35. The method as in claims 33 or 34, wherein the controlled inner diameter of the central core in an expanded state is: 15mm, 16mm, 17mm, 18mm, 19mm,

20mm, 21mm, 22mm, 23mm, 24mm, 25mm, 26mm, 27mm, 28mm, 29mm, 30mm, 31mm, 32mm, 33mm, 34mm, or 35mm.

36. The method as in claims 33, 34, or 35, wherein the length of the central core is longer in an unexpanded state as compared to an expanded state.

37. The method as in any of claims 33-36, further comprising monitoring the expansion of the expandable device utilizing radiopaque portions of the expandable device.

38. The method as in any of claims 33-37, wherein the expandable device is expanded by an inflatable balloon.

39. The method as in any of claims 33-37, wherein the expandable device is expanded mechanically.

40. The method as in any of claims 33-37, wherein the expandable device is self-expandable.

41. The method as in any of claims 33-40, wherein the site of deployment is within mammalian vasculature.

42. The method as in any of claims 33-40, wherein the site of deployment is within an anthropomorphic phantom.

43. The method as in any of claims 33-42, further comprising engaging the inner wall at the site of deployment with at least one appendage of the plurality of appendages.

44. The method as in any of claims 33-43, further comprising expanding a prosthetic valve within the inner circumference of the central core such that outer of the prosthetic valve engages with a valve seat within the central core.

45. A docking station for implanting within the vasculature, comprising:
a central section comprising a number of struts that form a number of cells, the

cells forming a circumference encircling the central section;

wherein the central section is capable of expanding from an unexpanded state radially outward to an expanded state;

wherein, when the central section is an expanded state, the central section includes a valve seat with an inner diameter;

an inflow section; and

an outflow section incorporating an arm that is bent outwardly into an elbow-like conformation;

wherein the central section is connected to and in between the inflow and the outflow sections;

wherein the inflow and outflow sections are capable of expanding from an unexpanded state radially outward to an expanded state; and

wherein the outer circumferences of the inflow and outflow sections are each greater than the outer circumference of the central section.

46. The docking station as in claim 45, wherein the inner diameter of the valve seat in an expanded state is between 15 and 35 mm.

47. The docking station as in claim 45 or 46, wherein the inner diameter of the valve seat in an expanded state is: 15mm, 16mm, 17mm, 18mm, 19mm, 20mm, 21mm, 22mm, 23mm, 24mm, 25mm, 26mm, 27mm, 28mm, 29mm, 30mm, 31mm, 32mm, 33mm, 34mm, or 35mm.

48. The docking station as in claim 45, 46, or 47, wherein the length of the docking station is longer in an unexpanded state as compared to an expanded state.

49. The docking station as in any of claims 45-48, wherein the width or thickness of at least one strut varies.

50. The docking station as in any of claims 45-49, wherein the arm is a cell formed by a number of struts.

51. The docking station as in any of claims 45-50, wherein the outflow

section comprises a number of struts that form a number of cells, the cells forming a circumference partially encircling the outflow section such that a gap is formed in the outflow section.

52. The docking station as in claim 51, wherein the arm is situated within the gap.

53. The docking station as in any of claims 45-52 wherein the inflow section comprises a number of struts that form a number of cells, the cells forming a circumference encircling the inflow section.

54. The docking station as in any of claims 45-53 further comprising at least one radiopaque portion integrated within the docking station.

55. The docking station as in claim 54, wherein the at least one radiopaque portion is integrated such that the bent arm is capable of being identified using radiography.

56. The docking station as in any of claims 46-55, wherein the docking station is made of a self-expanding material.

57. The docking station as in claim 56, where the self-expanding material is nitinol.

58. The docking station as in any of claims 45-57, wherein a cover is incorporated within the docking station.

59. The docking station as in claim 58, the cover is secured to the struts of the central section and to inflow section via sutures.

60. The docking station as in claim 58 or 59, the cover is impermeable to blood.

61. The docking station as in any of claims 58, 59, or 60, wherein the cover is a biocompatible fabric.

62. The docking station as in any of claims 58, 59, or 60, wherein the cover is a bioprosthetic tissue.

63. The docking station as in any of claims 58-62, wherein sealing portions are formed onto the cover that are capable of engaging an inner wall at a site of deployment.

64. The docking station as in any of claims 46-63, wherein the valve seat is configured to situate a prosthetic valve.

65. The docking station as in claim 64, wherein the outer perimeter of the prosthetic valve is compatible with the inner perimeter of the valve seat.

66. The docking station as in claims 64 or 65, wherein the outer diameter of the prosthetic valve is between 15mm and 35mm.

67. The docking station as in claims 64, 65, or 66, wherein the outer diameter of the prosthetic valve is: 15mm, 16mm, 17mm, 18mm, 19mm, 20mm, 21mm, 22mm, 23mm, 24mm, 25mm, 26mm, 27mm, 28mm, 29mm, 30mm, 31mm, 32mm, 33mm, 34mm, or 35mm.

68. The docking station as in any of claims 45-67, wherein, when the docking station is in a crimped state, the docking station is configured to be inserted within a catheter.

69. The docking station as in any of claims 46-68, wherein, when in an expanded state, the inflow and outflow sections are capable of engaging an inner wall at a site of deployment.

70. The docking station as in claim 69, wherein the inner wall is a luminal wall of a vasculature.

71. The docking station as in claim 70, wherein the vasculature at the site of deployment is the inferior vena cava or the superior vena cava.

72. The docking station as in claim 71, wherein the arm is configured to engage a wall within the right atrium.

73. A method of implanting a docking station, the method comprising:
delivering to a site of deployment a docking station, the docking station comprising a central section, an inflow section, an outflow section, and an arm;
wherein the central section comprises a number of struts that form a number of cells, the cells forming a circumference encircling the central section;
wherein the inflow section comprises a number of struts that form a number of cells, the cells forming a circumference encircling the inflow section;
wherein the outflow section comprises a number of struts that form a number of cells, the cells forming a circumference partially encircling the outflow section such a gap is formed in the outflow section;
wherein the arm is situated within the gap and is capable of bending into an elbow-like shape;
wherein the central section is connected to and in between the inflow and the outflow sections;
wherein the expandable device is delivered in an unexpanded state; and
expanding the docking station from the unexpanded state into an expanded state such that the central section is expanded to form a valve seat having an inner diameter and such that outer circumferences of the inflow and outflow sections are each greater than the outer circumference of the central section.

74. The method as in claim 73, wherein the inner diameter of the valve seat in an expanded state is between 15 and 35 mm.

75. The method as in claims 73 or 74, wherein the inner diameter of the valve seat in an expanded state is: 15mm, 16mm, 17mm, 18mm, 19mm, 20mm,

21mm, 22mm, 23mm, 24mm, 25mm, 26mm, 27mm, 28mm, 29mm, 30mm, 31mm, 32mm, 33mm, 34mm, or 35mm.

76. The method as in claims 73, 74, or 75, wherein the length of the docking station is longer in an unexpanded state as compared to an expanded state.

77. The method as in any of claims 73-76, further comprising monitoring the expansion of the docking station utilizing radiopaque portions of the expandable device.

78. The method as in any of claims 73-77, wherein the expandable device is self-expandable.

79. The method as in any of claims 73-78, wherein the site of deployment is within mammalian vasculature.

80. The method as in claim 79, wherein the site of deployment is the inferior vena cava or the superior vena cava.

81. The method as in any of claims 73-80, further comprising engaging an inner luminal wall at the site of deployment with the inflow section and engaging the right atrium wall with the arm.

82. The method as in any of claims 73-78, wherein the site of deployment is within an anthropomorphic phantom.

83. The method as in claim 82, further comprising engaging an inner luminal wall at the site of deployment with the inflow section.

84. The method as in any of claims 73-83, further comprising expanding a prosthetic valve within the valve seat such that an outer wall of the prosthetic valve engages with the valve seat.