We Claim:

1. A heart pump assembly comprising:

an elongate catheter having a proximal portion and a distal portion;

a rotor disposed at the distal portion of the elongate catheter, the rotor having an impeller blade, wherein the impeller blade is shaped to induce fluid flow in a first axial direction;

a drive shaft coupled to a proximal end of the rotor, the drive shaft including a pump element formed on a surface of the drive shaft; and

a bearing having a bore into which the drive shaft extends;

wherein the pump element is shaped to induce fluid flow through the bore in a second axial direction.

2. The heart pump assembly of claim 1, wherein the second axial direction is opposite to the first axial direction.

3. The heart pump assembly of claim 1, wherein the second axial direction is substantially the same as the first axial direction.

4. The heart pump assembly of any of the preceding claims, wherein a fluid supply line is in fluid communication with the bore, and wherein the pump element draws fluid from the fluid supply line through the bore.

5. The heart pump assembly of any of the preceding claims, wherein the pump element is disposed in a bearing gap between the drive shaft and a sleeve bearing.

6. The heart pump assembly of claim 5, wherein the bearing gap between the drive shaft and a sleeve bearing is in the range of about 5-15 microns.

7. The heart pump assembly of any of the preceding claims, wherein the pump element is shaped as a groove on the surface of the drive shaft.

8. The heart pump assembly of claim 7, wherein the groove on the surface of the drive shaft is angled with respect to a longitudinal axis of the drive shaft.

9. The heart pump assembly of claims 1-6, wherein the pump element is shaped as a protrusion on the surface of the drive shaft.

10. The heart pump assembly of any of the preceding claims, wherein a ratio of a flow rate of the fluid flow in the second axial direction to a flow rate of the fluid flow in the first axial direction is about 0.002% or less.

11. The heart pump assembly of any of the preceding claims, wherein the flow rate of the fluid flow in the first axial direction is about 2-5 liters per minute (lpm).

12. The heart pump assembly of any of the preceding claims, wherein the flow rate of the fluid flow in the second axial direction is about 2-30 cc/hr.

13. The heart pump assembly of any of the preceding claims, wherein the drive shaft is coupled to a motor.

14. The heart pump assembly of any of the preceding claims, further comprising a pump housing enclosing the rotor and bearing.

15. The heart pump assembly of claim 14, wherein the pump assembly is sized for percutaneous insertion.

16. The heart pump assembly of claim 15, further comprising:

a blood outlet positioned proximal to a proximal end of the pump housing; and

a blood inlet positioned at a distal end portion of a cannula of the pump assembly.

17. The heart pump assembly of claim 15, further comprising:

a blood outlet positioned at a distal end portion of a cannula of the pump assembly; and

a blood inlet positioned proximal to a proximal end of the pump housing.

18. A heart pump assembly comprising:

an elongate catheter having a proximal portion and a distal portion;

a rotor disposed at the distal portion of the elongate catheter, the rotor having an impeller blade, wherein the impeller blade is shaped to induce fluid flow in a first axial direction;

a drive shaft coupled to a proximal end of the rotor; and

a bearing having a bore into which the drive shaft extends, the bearing including a pump element formed in a surface of the bore;

wherein the pump element is shaped to induce fluid flow through the bore in a second axial direction.

19. The heart pump assembly of claim 18, wherein the second axial direction is opposite to the first axial direction.

20. The heart pump assembly of claim 18, wherein the second axial direction is substantially the same as the first axial direction.

21. The heart pump assembly of any of claims 18-20, wherein the pump element is shaped as a groove on the surface of the bore.

22. The heart pump assembly of claim 21, wherein the groove on the surface of the bore is angled with respect to a longitudinal axis of the drive shaft.

23. The heart pump assembly of claim any of claims 18-20, wherein the pump element is shaped as a protrusion on the surface of the bore.

24. The heart pump assembly of claim any of claims 18-23, wherein a ratio of a flow rate of the fluid flow in the second axial direction to a flow rate of the fluid flow in the first axial direction is about 0.001-0.03%.

25. The heart pump assembly of any of claims 18-24, wherein the flow rate of the fluid flow in the first axial direction is about 2-5 lpm.

26. The heart pump assembly of any of claims 18-25, wherein the flow rate of the fluid flow in the second axial direction is about 2-30 cc/hr.

27. A method for providing cardiac assistance, the method comprising:

positioning a heart pump in a patient's vasculature, wherein the heart pump comprises a rotor assembly having a first pump element and a second pump element, wherein the first and second pump elements rotate together;

rotating the rotor assembly to induce a blood flow in a first axial direction with the first pump element while concurrently inducing fluid flow in a second axial direction with the second pump element,

wherein the rate of fluid flow induced by the second pump element is less than 1% the rate of blood flow.

28. The method of claim 27, wherein the second axial direction is opposite to the first axial direction.

29. The method of claim 27, wherein the second axial direction is substantially the same as the first axial direction.

30. The method of any of claims 27-29, wherein the fluid flow induced by the second pump element is drawn through a fluid supply line.

31. The method of claim 30, wherein the fluid flow induced by the second pump element is through a bearing gap.

32. The method of claim 31, wherein the bearing gap is about 5 microns or less.

33. The method of any of claims 27-32, wherein the fluid flow in the first axial direction surrounds the fluid flow in the second axial direction.

34. The method of any of claims 27-33, wherein a ratio of a flow rate of the fluid flow in the second axial direction to a flow rate of the fluid flow in the first axial direction is about 0.001-0.03%.

35. The method of any of claims 27-34, wherein the flow rate of the fluid flow in the first axial direction is about 2-5 lpm.

36. The method of any of claims 27-35, wherein the flow rate of the fluid flow in the second axial direction is about 2-30 cc/hr.

37. The method of claim any of claims 27-36, wherein the second pump element is shaped as a groove on a surface of the rotor assembly.

38. The method of claim any of claims 27-36, wherein the second pump element is shaped as a protrusion on a surface of the rotor assembly.

39. The method of claim any of claims 27-38, wherein positioning a heart pump in a patient's vasculature comprises percutaneous implantation of the pump into the heart.