CLAIMS

What is claimed is:

1. A diagnostic system, comprising:

a catheter assembly including:

a catheter tube defining at least one lumen extending between a proximal end and a distal end;

a hub operably attached to the catheter tube;

an extension leg operably attached to the hub, the hub and extension leg defining at least one fluid passageway in fluid communication with the lumen of the catheter tube; and

a plurality of temperature sensors, wherein the catheter tube includes the plurality of the temperature sensors, each temperature sensor of the plurality of temperature sensors disposed in a different location of a plurality of locations along a length of the catheter tube for measuring a local temperature;

a console configured to communicate with the catheter assembly, the console including memory and a processor configured to instantiate a diagnostic process having one or more functions for at least processing temperature data while the catheter tube is disposed in a vasculature of a patient; and

a display screen configured to communicate with the console, the display screen configured to display a graphical user interface ("GUI") including at least a temperature reading associated with the plurality of sensors.

2. The diagnostic system of claim 1, wherein the console is configured to instantiate a display server configured to coordinate input to the console and output from the console, the input including selection of the one or more functions of the diagnostic process and the output including the GUI.

3. The diagnostic system of either claim 1 or 2, wherein the memory includes one or more temperature data-processing algorithms for processing the temperature data from any temperature sensor of the catheter assembly with the diagnostic process while the catheter tube is disposed in a vasculature of the patient.

4. The diagnostic system of claim 1, wherein the memory includes an infection-diagnosis algorithm for diagnosing infection in the vasculature or subcutaneous tissue of the patient with the diagnostic process at any one or more locations of the plurality of the locations along the length of the catheter tube in accordance with local temperature changes or trends thereof of the temperature sensor or the temperature sensors respectively at the one or more locations of the plurality of the locations.

5. The diagnostic system of any one of claims 1-3, wherein the plurality of temperatures sensors include at least one hub temperature sensor disposed within the hub.

6. The diagnostic system of claim 5, wherein the one or more functions of the diagnostic process includes a flushing-compliance function configured to provide a console-based alert when a flushing-compliant temperature change does not occur at the catheter-tube temperature sensor, the hub temperature sensor, or both the catheter-tube temperature sensor and the hub temperature sensor as expected from room-temperature flushate being flushed through the catheter assembly after patient-temperature blood is drawn from the catheter assembly or at recommended intervals or instances.

7. The diagnostic system of any one of claims 1-3, wherein the catheter tube includes a primary catheter-tube temperature sensor disposed within the catheter tube and the console includes a proportional-integral-derivative ("PID") controller communicatively coupled to the primary catheter-tube temperature sensor configured to maintain the primary catheter-tube temperature sensor at a set number of degrees above blood temperature.

8. The diagnostic system of claim 7, wherein the one or more functions of the diagnostic process includes a blood-flowrate function in which the diagnostic process utilizes a blood-flowrate algorithm to monitor blood flowrate about the primary catheter-tube temperature sensor by way of an amount of power required to maintain the primary catheter-tube temperature sensor at the set

number of degrees above blood temperature, the blood flowrate being proportional to the amount of power required to maintain the primary catheter-tube temperature sensor at the set number of degrees above blood temperature.

9. The diagnostic system of claim 8, wherein the one or more functions of the diagnostic process includes a cardiac-parameter function in which the diagnostic process utilizes the blood-flowrate algorithm in combination with a cardiac-parameter algorithm to determine cardiac parameters including cardiac stroke volume.

10. The diagnostic system of claim 8, wherein the one or more functions of the diagnostic process includes a catheter-tracking function in which the diagnostic process utilizes the blood-flowrate algorithm in combination with a catheter-tracking algorithm to determine when the primary catheter-tube temperature sensor is advanced past a vascular junction in accordance with a volumetric increase in blood flow.

11. The diagnostic system of claim 10, wherein the diagnostic process is configured to provide catheter-tracking data resulting from the catheter-tracking algorithm as display-server input for display-server output to the GUI of the display screen, the display-server output to the GUI providing a clinician an indication of location of the catheter tube in the vasculature of the patient.

12. The diagnostic system of either claim 10 or claim 11, wherein the catheter tube includes a secondary catheter-tube temperature sensor disposed within the catheter tube proximal of the primary catheter-tube temperature sensor for determining malposition of the catheter tube in the vasculature of the patient.

13. The diagnostic system of claim 12, wherein the catheter-tracking function is configured to determine malposition of the catheter in accordance with the temperature data from the secondary catheter-tube temperature sensor, the temperature data from the secondary catheter-tube temperature sensor indicating the blood temperature of the patient when the catheter tube is moved against the blood flow or an elevated blood temperature when the catheter tube

is moved with the blood flow on account of the primary catheter-tube temperature sensor being at the set number of degrees above the blood temperature.

14. The diagnostic system of any one of the preceding claims, further comprising an electrocardiogram ("ECG") stylet or leads embedded within the catheter assembly, the one or more functions of the diagnostic process including an ECG function for processing ECG data while the ECG stylet is disposed in the catheter tube and the catheter tube is disposed in a vasculature of a patient to confirm location of a tip of the catheter tube, monitor migration of the tip of the catheter tube, determine heart rate, or a combination thereof.

15. A method of a diagnostic system, comprising:

instantiating in memory of a console a diagnostic process having one or more functions for at least processing temperature data;

sending the temperature data to the console from a catheter assembly having plurality of temperature sensors, wherein the catheter tube includes the plurality of the temperature sensors, each temperature sensor of the plurality of temperature sensors disposed in a different location of a plurality of locations along a length of the catheter tube for measuring a local temperature;

loading the temperature data in the memory and processing the temperature data with a processor of the console in accordance with the one or more functions for processing the temperature data; and

displaying in a GUI on a display screen configured to communicate with the console at least a temperature reading associated with the plurality of sensors.

16. The method of claim 15, further comprising monitoring blood flowrate about any temperature sensor of the catheter assembly disposed within a vasculature of a patient with a blood-flowrate function utilizing a blood-flowrate algorithm, the blood flowrate being proportional to an amount of power required to maintain a temperature-sensor temperature at a set number of degrees above blood temperature.