CLAIMS

1. A method for determining data processing settings for a flow cytometer comprising:

passing a set of calibration particles through a flow cell;

illuminating each of the set of calibration particles passing through the flow cell with at least two light beams wherein each light beam is associated with a channel;

collecting light emitted from each of the set of calibration particles using a detector associated with each channel;

recording data from each detector;

setting a trigger channel to initiate a transfer of data from a first data collection time window associated with the trigger channel when a data signal threshold for the trigger channel is exceeded;

setting a second channel to transfer data from a second data collection time window associated with the second channel when the data signal threshold for the trigger channel is exceeded, and wherein the start of the second data collection time window is based on a spatial path between the trigger channel and the second channel;

recording data from the first data collection time window to a data store each time the data signal threshold is exceeded;

recording data from the second data collection time window to the data store each time the data signal threshold for the trigger channel is exceeded;

analyzing a distribution of data intensity peak times within the second data collection time window; and

calculating a time delay based on the distribution of data intensity peak times in the second data collection time window to modify the size and/or shift the second data collection time window.

2. The method in claim 1, wherein the light emitted is fluorescent.

3. The method of claim 1, wherein the light emitted is scattered.

4. The method in claim 1, wherein the start of the second data collection time window is based on a flow rate.

5. The method in claim 1, wherein the start of the second data collection time window is based on a sheath fluid flow rate.

6. The method in claim 1, wherein the spatial path is between about 80 to 250 micrometers.

7. The method in claim 1, wherein the spatial path is about 150 micrometers.

8. The method in claim 1, wherein the data collection time windows comprises 80 to 120 ADC points at intervals of either 500 nanoseconds or 1 microsecond .

9. The method in claim 1, wherein the data collection time windows comprises 320 to 360 ADC points at intervals of either 500 nanoseconds or 1 microsecond.

10. A system to determine data processing settings for a flow cytometer comprising:

a flow cell configured to flow calibration particles;

at least two light sources each configured to emit a light beam, wherein each light beam is associated with a channel and, wherein the light beams pass through the flow cell;

a detector associated with each channel wherein each detector is configured to collect light emitted from each of the set of calibration beads;

a memory buffer configured to record data from each of the detectors;

a trigger channel configured to initiate a transfer of data from a first data collection time window associated with the trigger channel when a data signal threshold for the trigger channel is exceeded;

a second channel configured to transfer data from a second data collection time window associated with the second channel when the data signal threshold for the trigger channel is exceeded wherein the start of the second data collection time window is based on a spatial path between the trigger channel and second channel;

a trigger processor configured to:

transfer the data from the first data collection time window to a data storage each time the data signal intensity threshold is exceeded; and

transfer the data from the second data collection time window to the data storage each time the data signal intensity threshold is exceeded;

a computer processor configured analyze a distribution of data intensity peak times within the second data collection time window and calculate a time delay based on the distribution of data intensity peak times in the second data collection time window to position a data signal in the second channel in the second data collection time window.

11. The system in claim 10, further comprising a field programmable gate array wherein the memory buffer and the trigger processor are subcomponents of a field programmable gate array.

12. The system in claim 10, wherein the light emitted is fluorescent.

13. The system of claim 10, wherein the light emitted is scattered.

14. The system in claim 10, wherein the start of the second data collection time window is based on a flow rate.

15. The system in claim 10, wherein the start of the second data collection time window is based on a sheath fluid flow rate.

16. The system in claim 10, wherein the spatial path is between about 80 to 250 micrometers.

17. The system in claim 10, wherein the spatial path is about 150 micrometers.

18. The system in claim 10, wherein the data collection time windows comprises 80 to 120 ADC points at intervals of either 500 nanoseconds or 1 microsecond.

19. The system in claim 10, wherein the data collection time windows comprises 320 to 360 ADC points at intervals of either 500 nanoseconds or 1 microsecond.

20. A fluidic diagnostic method for a flow cytometer comprising:

passing a set of calibration particles through a flow cell;

illuminating each of the set of calibration particles passing through the flow cell with at least two light beams wherein each light beam is associated with a channel;

collecting light emitted from each of the set of calibration particles using a detector associated with each channel;

recording data from each of the detectors;

setting a trigger channel to initiate a transfer of data from a first data collection time window associated with the trigger channel when a data signal threshold for the trigger channel is exceeded;

setting a second channel to transfer data from a second data collection time window associated with the second channel when the data signal threshold for the trigger channel is exceeded;

recording data from the first data collection time window to a data store each time the data signal threshold is exceeded;

recording data from the second data collection time window to the data store each time the data signal threshold for the trigger channel is exceeded;

analyzing a distribution of data intensity peak times within the second data collection time window;

identifying an area of the distribution meeting data quality requirements for a given experiment i.e. a system specification; and

comparing it to the distribution as a whole to determine fluid pressure, mechanical perturbation in a pump, particle arrival time and laminar flow stability.

21. The method in claim 20, wherein the system specification is 1 standard deviation.

22. The method in claim 20, wherein the system specification is 2 standard deviations.

23. The method in claim 20, wherein the system specification is 3 standard deviations.

24. The method in claim 20, wherein the system specification is 4 standard deviations.

25. The method in claim 20, wherein the system specification is a Gaussian distribution.

26. The method in claim 20, wherein the system specification is a Poisson distribution.

27. The method in claim 20, wherein the system specification is any statistical distribution.

28. The method in claim 20, wherein the light emitted is fluorescent.

29. The method of claim 20, wherein the light emitted is scattered.

30. The method in claim 20, wherein the data collection time windows comprise 80 to 120 ADC points wide at intervals of either 500 nanoseconds or 1 microsecond.

31. The method in claim 20, wherein the data collection time windows comprise 320 to 360 ADC points at intervals of either 500 nanoseconds or 1 microsecond.

32. A fluidic diagnostic system for a flow cytometer comprising:

a flow cell configured to flow calibration particles;

at least two light sources each configured to emit a light beam, wherein each light beam is associated with a channel and, wherein the light beams pass through the flow cell;

a detector associated with each channel wherein each detector is configured to collect light emitted from each of the set of calibration beads;

a memory buffer configured to record data from each of the detectors;

a trigger channel configured to initiate a transfer of data from a first data collection time window associated with the trigger channel when a data signal threshold for the trigger channel is exceeded;

a second channel configured to transfer data from a second data collection time window associated with the second channel when the data signal threshold for the trigger channel is exceeded;

a trigger processor configured to:

transfer the data from the first data collection time window to a data storage each time the data signal intensity threshold is exceeded; and

transfer the data from the second data collection time window to the data storage each time the data signal intensity threshold is exceeded;

a computer processor configured to compare a distribution of data intensity peak times within the second data collection time window to a system specification to determine fluid pressure, mechanical perturbation in a pump, particle arrival time and laminar flow stability.

33. The system in claim 32, further comprising a field programmable gate array wherein the memory buffer and the trigger processor are subcomponents of the field programmable gate array.

34. The system in claim 32, wherein the system specification is 1 standard deviation.

35. The system in claim 32, wherein the system specification is 2 standard deviations.

36. The system in claim 32, wherein the system specification is 3 standard deviations.

37. The system in claim 32, wherein the system specification is 4 standard deviations.

38. The system in claim 32, wherein the system specification is a Gaussian distribution.

39. The system in claim 32, wherein the system specification is a Poisson distribution.

40. The system in claim 32, wherein the system specification is any statistical distribution.

41. The system in claim 32, wherein the light emitted is fluorescent.

42. The system of claim 32, wherein the light emitted is scattered.

43. The system in claim 32, wherein the data collection time windows comprise 80 to 120 ADC points at intervals of either 500 nanoseconds or 1 microsecond.

44. The system in claim 32, wherein the data collection time windows are between about 320 to about 360 ADC points at intervals of either 500 nanoseconds or 1 microsecond.