What is claimed is:

1. A pipette instrument, comprising:

a body carrying:

a source of suction;

a pipette tip interface configured to hold a removable pipette tip and to place an installed pipette tip into communication with said source of suction;

interrogation circuitry configured to receive an input signal from said installed pipette tip and adapted for detecting particles moving through said installed pipette tip;

a source of electrical energy in operable association with:

a display panel capable of visually presenting information to a user; and

a microprocessor and an associated memory; wherein:

said pipette tip interface is further structured and arranged to dispose an installed said pipette tip in communication with said interrogation circuitry when said pipette tip is of the type that is structured to cooperate with said interrogation circuitry such that Coulter principle phenomena and/or Stokes-shift phenomena may be detected responsive to particles suspended in fluid flowing through said pipette tip.

2. The pipette instrument according to claim 1, further comprising:

a hydrophobic barrier element carried on a removable tip interface module and adapted to resist flow of fluid from an installed pipette tip past said barrier element and further into said pipette instrument.

3. The pipette instrument according to claim 1, further comprising:

a user operable control system operable to select a desired mode of operation of said pipette instrument from a plurality of operable modes, said user operable control

system comprising a track wheel.

4. The pipette instrument according to claim 3, wherein:

said track wheel is disposed to interface:

for actuation by rolling along a length axis of a finger of a hand that is holding said body; and

in registration with a distal portion of said finger.

5. The pipette instrument according to claim 3, wherein:

said track wheel is structured to provide an input to said pipette instrument by permitting said finger to depress said track wheel in a trigger-squeezing motion.

6. The pipette instrument according to claim 1, further comprising:

a pressure transducer in communication with said microprocessor and disposed to monitor a suction pressure profile delivered to said pipette tip interface.

7. The pipette instrument according to claim 1, further comprising:

a USB port structured to permit communication between said pipette instrument and a remote terminal.

8. The pipette instrument according to claim 1, further comprising:

a wireless communication module structured to permit communication between said pipette instrument and a remote terminal.

9. The pipette instrument according to claim 1, further comprising:

software that may be loaded into said memory effective to program said microprocessor to permit said pipette instrument to perform a selected test.

10. The pipette instrument according to claim 1, wherein:

said source of electrical energy comprises a battery.

11. The pipette instrument according to claim 1, wherein:

said source of suction comprises a surplus vacuum in a reservoir; and

a regulator operable to down-regulate said surplus vacuum is disposed for action between said reservoir and said pipette tip interface effective to place a desired vacuum profile in communication with said installed pipette tip and thereby permit aspiration of a desired fluid sample.

12. The pipette instrument according to claim 11, wherein:

said surplus vacuum is created by user displacement of a biased element associated with said body.

13. The pipette instrument according to claim 11, wherein:

said surplus vacuum is created with an electric pump.

14. The pipette instrument according to claim 1, wherein:

said source of suction comprises an electric pump operable under control of said microprocessor directly to generate an actual desired suction profile delivered to said pipette tip interface, said suction profile including at least two approximately constant values for applied suction that are separated by a ramp event.

15. The pipette instrument according to claim 1, wherein:

a hand-held portion of said pipette instrument is configured both:

to apply a first signal to an installed pipette tip; and

to receive a second signal from said pipette tip, said second signal being different from said first signal.

16. A method for particle counting, the method being implemented in a pipette instrument having a pipette tip installed therein effective to place a sensor component of said pipette tip in communication with interrogation circuitry carried by said pipette instrument, the method comprising:

applying a first signal to said sensor component;

generating a raw histogram based at least in part upon a second signal received from said sensor component of said pipette tip, said second signal varying over time responsive to flow of a sample of particle-bearing fluid through said pipette tip;

performing a determination based on at least a portion of said raw histogram to obtain one or more observed particle count; and

outputting said one or more observed particle count to a display terminal.

17. The method according to claim 16, further comprising:

selecting a lower threshold boundary;

selecting an upper threshold boundary; and

calculating a particle count based upon data collected between the selected boundaries.

18. The method according to claim 16, further comprising:

performing a mathematical computation on said observed particle count to determine a true particle count.

19. The method according to claim 16, further comprising:

obtaining a corrected histogram based on a mathematical analysis of said raw histogram and a probability that at any instant there is more than one particle in an interrogation zone of said sensor component.

20. The method according to claim 16, further comprising:

applying a correction factor, incorporating one or more calibration histogram associated with said sensor component, to said raw histogram to obtain a particle count.

21. The method according to claim 16, further comprising:
collecting sufficient data to determine a volumetric particle count.

22. The method according to claim 16, wherein:
said pipette instrument is configured to permit its operation as a hand-held instrument.

What is claimed is:

1. A pipette instrument, comprising:

a body carrying:

a source of suction;

a pipette tip interface configured to hold a removable pipette tip and to place an installed pipette tip into communication with said source of suction;

interrogation circuitry configured to receive an input signal from said installed pipette tip and adapted for detecting particles moving through said installed pipette tip;

a source of electrical energy in operable association with:

a display panel capable of visually presenting information to a user; and

a microprocessor and an associated memory;

a user operable control system comprising a track wheel operable to select a desired mode of operation of said pipette instrument from a plurality of operable modes, said track wheel is disposed to interface:

for actuation by rolling along a length axis of a finger of a hand that is holding said body; and

in registration with the distal portion of said finger;

wherein:

said pipette tip interface is further structured and arranged to dispose an installed said pipette tip in communication with said interrogation circuitry when said pipette tip is of the type that is structured to cooperate with said interrogation circuitry such that a value of said input signal may be caused to vary over time responsive to particles entrained in fluid flowing through said pipette tip, and whereby Coulter principle phenomena and/or Stokes-shift phenomena may be detected.

2. The pipette instrument according to claim 1, further comprising:

a hydrophobic barrier element carried on a removable module and adapted to resist flow of fluid from an installed pipette tip past said barrier element and further into said pipette instrument.

3. The pipette instrument according to claim 1, wherein:

said track wheel is structured to provide an input to said pipette instrument by permitting said finger to depress said track wheel in a trigger-squeezing motion.

4. The pipette instrument according to claim 1, further comprising:

a pressure transducer in communication with said microprocessor and disposed to monitor a suction pressure profile delivered to said pipette tip interface.

5. The pipette instrument according to claim 1, further comprising:

a USB port structured to permit communication between said pipette instrument and a remote terminal.

6. The pipette instrument according to claim 1, further comprising:

a wireless communication module structured to permit communication between said pipette instrument and a remote terminal.

7. The pipette instrument according to claim 1, further comprising:

software that may be loaded into said memory effective to program said microprocessor to permit said pipette instrument to perform a selected test.

8. The pipette instrument according to claim 1, wherein:

said source of electrical energy comprises a battery.

9. The pipette instrument according to claim 1, wherein:

said source of suction comprises a surplus vacuum in a reservoir; and

a regulator operable to down-regulate said surplus vacuum is disposed for action between said reservoir and said pipette tip interface effective to place a desired vacuum profile in communication with said installed pipette tip and thereby permit aspiration of a fluid sample.

10. The pipette instrument according to claim 9, wherein:

said surplus vacuum is created by user displacement of a biased element associated with said body.

11. The pipette instrument according to claim 9, wherein:

said surplus vacuum is created with an electric pump.

12. The pipette instrument according to claim 1, wherein:

said source of suction comprises an electric pump operable under control of said microprocessor directly to generate an actual desired suction profile delivered to said pipette tip interface, said suction profile including at least two approximately constant values for applied suction that are separated by a ramp event.

13. The pipette instrument according to claim 1, wherein:

said interrogation circuitry is adapted for particle counting by detection of signals resulting from Stokes-shift phenomena occurring in said pipette tip.

14. The pipette instrument according to claim 1, wherein:

said interrogation circuitry is adapted for particle counting by detection of signals resulting from Coulter principle phenomena occurring in said pipette tip.

15. The pipette instrument according to claim 1, wherein:

a hand-held portion of said pipette instrument is configured both:

to apply a first signal to an installed pipette tip; and

to receive a second signal from said pipette tip, said second signal being different from said first signal.

16. A method for particle counting, comprising:

providing a pipette instrument comprising a user operable control system comprising a track wheel operable to select a desired mode of operation of said pipette instrument from a plurality of operable modes, said track wheel is disposed to interface for actuation by rolling along a length axis of a finger of a hand that is holding said body and being disposed for registration with a distal portion of said finger;

installing a pipette tip in said pipette instrument effective to place a sensor component of said pipette tip in communication with interrogation circuitry associated with and carried by said pipette instrument;

using said pipette instrument to apply a first signal to said sensor component;

generating a raw histogram based at least in part upon a second signal received from said sensor component of said pipette tip, said second signal varying over time responsive to flow of a sample of particle-bearing fluid through said pipette tip;

performing a determination based on at least a portion of said raw histogram to obtain one or more observed particle count; and

outputting said one or more observed particle count to a display terminal.

17. The method according to claim 16, further comprising:
selecting a lower threshold boundary;
selecting an upper threshold boundary; and
calculating a particle count based upon data collected between the selected boundaries.

18. The method according to claim 16, further comprising:
performing a mathematical computation on said observed particle count to determine a true particle count.

19. The method according to claim 16, further comprising:
obtaining a corrected histogram based on a mathematical analysis of said raw histogram and a probability that at any instant there is more than one particle in an interrogation zone of said sensor component.

20. The method according to claim 16, further comprising:
applying a correction factor, incorporating one or more calibration histogram associated with said sensor component, to said raw histogram to obtain a particle count.

21. The method according to claim 16, further comprising:
collecting sufficient data to determine a volumetric particle count.