WHAT IS CLAIMED IS:

1. An automated method of enumerating hard-to-ghost cells, which are defined as cells that retain all or some of their original hemoglobin content following mixing with a ghosting reagent, in a blood cell sample comprising:

(a) mixing a blood cell sample with a nucleic acid stain ~~to stain nucleic acid~~ and a ghosting reagent to remove hemoglobin from red blood cells in the blood cell sample, thereby generating a ghosted blood cell sample;

(b) passing the ghosted blood cell sample through a cytometric flow cell;

(c) analyzing the ghosted blood cell sample in the cytometric flow cell using axial light loss and light scatter ~~two different optical~~ measurements;

(d) differentiating hard-to-ghost cells in the ghosted blood cell sample from other cells using the analysis by axial light loss and light scatter ~~the two different optical~~ measurements; and

(e) enumerating the hard-to-ghost cells.

2. The method of claim 1, wherein mixing of the blood sample with the nucleic acid-staining dye and the ghosting reagent is performed separately.

3. The method of claim 1, wherein the stain is fluorescent or non-fluorescent.

4. The method of claim 1, wherein the light scatter measurement is selected from upper median angle light scatter (UMALS), lower median angle light scatter (LMALS), and low angle light scatter (LALS). ~~optical measurement comprises axial light loss, fluorescence, or light scatter.~~

5. The method of claim 1, further comprising determining an existence of an abnormal population of hard-to-ghost cells by comparing the number of hard-to-ghost cells in the blood cell sample to a threshold value and reporting the number of hard-to-ghost cells that exceeds the threshold value.

6. A method of detecting hard-to-ghost cells which are defined as cells that retain all or some of their original hemoglobin content following mixing with a ghosting reagent, in a blood sample comprising:

(a) mixing the blood sample with a ghosting reagent to remove hemoglobin from red blood cells, thereby generating a ghosted blood sample;

(b) evaluating the ghosted blood sample in a cytometric flow cell by a detection comprising an axial light loss measurement for each cell, thereby generating event data; and

(c) identifying hard-to-ghost cells using the event data comprising axial light loss measurement for each cell. ~~of the event data.~~

7. The method of claim 6, wherein the identification of the hard-to-ghost cells using the axial light loss measurement comprises comparing the axial light loss measurement against a first threshold and a light scatter measurement against a second threshold, wherein the hard-to-ghost cells are identified as having an axial light loss measurement greater than the first threshold and a light scatter measurement lower than the second threshold.

8. The method of claim 7~~6~~, wherein the light scatter measurement is selected from ~~comprises~~ upper median angle light scatter (UMALS), lower median angle light scatter (LMALS), and low angle light scatter (LALS).

9. The method of claim 8, wherein the light scatter measurement is UMALS.

10. The method of claim 6, further comprising collecting direct current impedance measurements.

11. A method of enumerating hard-to-ghost cells, which are defined as cells that retin all or some of their original hemoglobin content following mixing with a ghosting reagent, in a blood sample comprising:

(a) mixing the blood sample with a ghosting reagent to remove hemoglobin from red blood cells, thereby generating a ghosted blood sample;

(b) evaluating the ghosted blood sample in a cytometric flow cell by a detection comprising an axial light loss measurement for each cell, thereby generating event data;

(c) identifying hard-to-ghost cells using axial light loss measurement of the event data;

(d) enumerating the hard-to-ghost cell population using the axial light loss measurement; and

(e) reporting the hard-to-ghost cell population in the blood sample,

12. The method of claim 11, wherein reporting the hard-to-ghost cell population includes reporting a ratio of the hard-to-ghost cell population to total red blood cells.

13. The method of claim 11, wherein reporting the hard-to-ghost cell population includes reporting a % hard-to-ghost cells of total red blood cell population.

14. A method of detecting an abnormal population of hard-to-ghost cells, which are defined as cells that retain all or some of their original hemoglobin content following mixing with a ghosting reagent, in a patient sample, comprising:

(a) mixing a blood sample from the patient with a ghosting reagent to remove hemoglobin from red blood cells, thereby generating a ghosted blood sample;

(b) evaluating the ghosted blood sample in a cytometric flow cell by a detection comprising an axial light loss measurement for each cell, thereby generating event data;

(c) identifying hard-to-ghost cells using axial light loss measurement of the event data;

(d) enumerating the hard-to-ghost cell population using the axial light loss measurement; and

(e) determining existence of abnormal population of hard-to-ghost cells when the number of hard-to-ghost cells exceeds a threshold value.

15. The method of claim 14, wherein the abnormal population of hard-to-ghost cells is associated with hemoglobinopathy.

16. The method of claim 15, wherein hemoglobinopathy comprises sickle cell anemia or thalassemia.

17. A method of analyzing a blood sample, comprising:

(a) mixing the blood sample with a ghosting reagent to remove hemoglobin from red blood cells, thereby generating a ghosted blood sample;

(b) measuring the ghosted blood sample in a cytometric flow cell by a detection comprising an axial light loss measurement to generate event data comprising an axial light loss measurement for each cell;

(c) identifying a hard-to-ghost cell population which are defined as cells that retain all or some of their original hemoglobin content following mixing with a ghosting reagent, using the event data, based on said axial light loss measurement;

(d) filtering-out the hard-to-ghost cell population from said event data; and

(e) analyzing the event data without the hard-to-ghost cell population to identify blood cell distribution patterns.

18. A computer readable medium storing instructions wherein said instructions when executed cause at least one processor to analyze a blood sample using a method comprising:

(a) generating event data comprising an axial light loss measurement for each cell based on a detection comprising an axial light loss measurement of a ghosted blood sample in a cytometric flow cell; and

(b) identifying a hard-to-ghost cell population which are defined as cells that retain all or some of their hemoglobin content following mixing with a ghosting reagent, using the event data, based on said axial light loss measurement.

19. The computer readable medium of claim 18, wherein the method further comprises:

(c) filtering-out the hard-to-ghost cell population from said event data; and

(d) analyzing the event data without the hard-to-ghost cell population to identify blood cell distribution patterns.

20. The computer readable medium of claim 18, wherein the method further comprises:

(c) enumerating the hard-to-ghost cell population using the axial light loss measurement; and

(d) determining existence of abnormal population of hard-to-ghost cells when the number of hard-to-ghost cells exceeds a threshold value.

21. The computer readable medium of claim 18, wherein the method further comprises:

(c) enumerating the hard-to-ghost cell population using the axial light loss measurement; and

(d) reporting the hard-to-ghost cell population in the blood sample.

22. A system for analyzing a blood sample, comprising:

at least one processor;

a particle analyzer coupled to the at least one processor and comprising a cytometric flow cell;

a detector module coupled to the at least one processor and configured to generate event data based on a detection comprising an axial light loss measurement for each cell of a ghosted blood sample in the flow cell; and

an analyzer module coupled to the at least one processor and configured to identify a hard-to-ghost cell population which are defined as cells that retain all or some of their original hemoglobin content following mixing with a ghosting reagent using the event data, based on said axial light loss measurement.

23. The system of claim 22, wherein the analyzer module is further configured to enumerate the hard-to-ghost cell population using the axial light loss measurement.

24. The system of claim 22, wherein the analyzer module is further configured to:

filter-out the hard-to-ghost cell population from said event data; and

analyze the event data without the hard-to-ghost cell population to identify blood cell distribution patterns.

25. An automated method of enumerating hard-to-ghost cells which are defined as cells that retain some or all of their hemoglobin content following mixing with a ghosting reagent in a blood cell sample comprising:

(a) mixing a blood cell sample with a nucleic acid-staining fluorescent dye to stain the blood cells containing nucleic acid and a ghosting reagent to remove hemoglobin from red blood cells in the blood cell sample, thereby generating a ghosted blood cell sample;

(b) passing the ghosted blood cell sample through a cytometric flow cell;

(c) analyzing the ghosted blood cell sample in the cytometric flow cell by using ~~light scatter~~axial light loss and fluorescence measurements;

(d) differentiating hard-to-ghost cells from the fluorescently stained cells ~~containing nucleic acid~~ and ghosted cells using the analysis by the fluorescence and ~~light scatter~~axial light loss measurements; and

(e) enumerating the hard-to-ghost cells.

26. The method of claim 25, wherein mixing of the blood sample with the nucleic acid-staining fluorescent dye and the ghosting reagent is performed separately.

27. The method of claim 25, further comprising determining an existence of an abnormal population of hard-to-ghost cells by comparing the number of hard-to-ghost cells in the blood cell sample to a threshold value and reporting the number of hard-to-ghost cells that exceeds the threshold value.

28. The method of claim 27, wherein the abnormal population of hard-to-ghost cells is associated with hemoglobinopathy.

29. The method of claim 28, wherein hemoglobinopathy comprises sickle cell anemia or thalassemia.