containing biological sample to the cytometry station.

**[00226]** In some embodiments, provided herein is a biological sample processing device comprising: a) a sample handling system; b) a detection station; c) a cytometry station comprising an imaging device and a stage for receiving a microscopy cuvette; and d) an assay station configured to support multiple components comprising i) a biological sample, ii) at least a first, a second, and a third fluidically isolated assay unit, and iii) reagents to perform A) at least one immunoassay; B) at least one general chemistry assay; and C) at least one cytometry assay, and wherein the sample handling system is configured to i) transfer at least a portion of the biological sample to the first assay unit, the second assay unit, and the third assay unit; ii) transfer the first and second assay units containing biological sample to the detection station; and iii) transfer the third assay unit containing biological sample to the cytometry station.

**[00227]** In some embodiments, provided herein is a biological sample processing device comprising: a) a sample handling system; b) a first detection station comprising an optical sensor; c) a second detection station comprising a light source and an optical sensor; d) a cytometry station comprising an imaging device and a stage for receiving a microscopy cuvette; and e) an assay station configured to support i) a biological sample, ii) at least a first, a second, and a third fluidically isolated assay unit, and iii) reagents to perform A) at least one luminescence assay; B) at least one absorbance, turbimetric, or colorimetric assay; and C) at least one cytometry assay; wherein the first assay unit is configured to perform a luminescence assay, the second assay unit is configured to perform an absorbance, turbidimetric, or colorimetric assay, the third assay unit is configured to perform a cytometry assay, and the sample handling system is configured to i) transfer at least a portion of the biological sample to the first, second, and third assay units; ii) transfer the first assay unit containing biological sample to the first detection station; iii) transfer the second assay unit containing biological sample to the second detection station; and iv) transfer the third assay unit containing biological sample to the stage of the cytometry station.

**[00228]** In some embodiments, provided herein is biological sample processing device, comprising: a) a sample handling system; b) a detection station comprising an optical sensor; c) a fluidically isolated sample collection unit configured to retain a biological sample; d) an assay station comprising at least a first, second, and third fluidically isolated assay unit, wherein the first unit comprises an antibody, the second unit comprises an oligonucleotide, and the third unit comprises a ~~chromogenic substrate~~ chromogen; and e) a controller, wherein the controller is operatively coupled to the sample handling system, wherein the sample handling system is configured to transfer a portion of the biological sample from the sample collection unit to each of the first assay unit, the second assay unit, and the third assay unit, and the device is configured to

perform an immunoassay, a nucleic acid assay, and a general chemistry assay comprising a ~~chromogenic substrate~~ chromogen.

**[00229]** In some embodiments, provide herein is a biological sample processing device, comprising a housing containing therein: a) a sample handling system; b) a detection station comprising an optical sensor; c) a fluidically isolated sample collection unit configured to retain a biological sample; d) an assay station comprising at least a first, second, and third fluidically isolated assay unit, wherein the first unit comprises a first reagent, the second unit comprises a second reagent, and the third unit comprises a third reagent; and e) a controller, wherein the controller comprises a local memory and is operatively coupled to the sample handling system and the detection station; wherein the device is configured to perform assays with any one or more of the first, second, and third assay units; wherein the local memory of the controller comprises a protocol comprising instructions for: i) directing the sample handling system to transfer a portion of the biological sample to the first assay unit, the second assay unit and the third assay unit; and ii) directing the sample handling system to transfer the first unit, the second unit, and the third assay unit to the detection station.

**[00230]** In some embodiments, provided herein is a method of performing at least 4 different assays selected from immunoassays, cytometric assays, and general chemistry assays on a biological sample, the method comprising: a) introducing a biological sample having a volume of no greater than ~~2 ml, 1 ml,~~ 500 microliters~~, 300 microliters, 200 microliters, 100 microliters, 50 microliters, 25 microliters, 25 microliters, 10 microliters, or 5 microliters~~ into a sample processing device, wherein the device comprises: i) a sample handling system; ii) a detection station; iii) a cytometry station comprising an imaging device and a stage for receiving a microscopy cuvette; and iv) an assay station comprising at least a first, a second, a third, and a fourth~~, and a fifth~~ independently movable assay unit; b) with the aid of the sample handling system, transferring a portion of the biological sample to each of the first, second, third, and fourth assay units, wherein a different assay is performed in each of the first, second, third, and fourth assay units; c) with the aid of the sample handling system, transferring the first, second, third, and fourth assay units to the detection station or cytometry station, wherein assay units comprising immunoassays or general chemistry assays are transferred to the detection station and assay units comprising cytometric assays are transferred to the cytometry station; d) with the aid of the detection station or cytometry station, obtaining data measurements of the assay performed in each of the first, second, third, and fourth assay units. In some embodiments, the above method may apply to a method of performing 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 150, 200, or more different assays.

**[00231]** In some embodiments, provided herein is a method of processing a biological sample,

comprising: a) introducing a sample having a volume of ~~2 ml, 1 ml,~~ 500 microliters~~, 300 microliters, 200 microliters, 100 microliters, 50 microliters, 25 microliters, 25 microliters, 10 microliters, or 5 microliters~~ or less into a sample processing device comprising i) a sample handling system; ii) at least a first and a second fluidically isolated vessel; and iii) a diluent, wherein the sample comprises bodily fluid at a first concentration; b) with the aid of the sample handling system, mixing at least a portion of the sample with the diluent to generate a diluted sample, wherein the diluted sample comprises bodily fluid at a second concentration, and the second concentration of bodily fluid is one-half~~, one-third, one-quarter, one-tenth,~~ or less of the first concentration of bodily fluid; and, c) with the aid of the sample handling system, transferring at least a portion of the diluted sample to the first and the second fluidically isolated vessels.

**[00232]** In some embodiments, provided herein is a method of processing a biological sample, comprising: a) introducing a sample having a volume of ~~2 ml, 1 ml,~~ 500 microliters~~, 300 microliters, 200 microliters, 100 microliters, 50 microliters, 25 microliters, 25 microliters, 10 microliters, or 5 microliters~~ or less into a sample processing device comprising i) a sample handling system; ii) at least a first and a second fluidically isolated vessel; iii) a diluent; and iv) a centrifuge, wherein the sample comprises bodily fluid at a first concentration; b) with the aid of the sample handling system, introducing at least a portion of the sample into the centrifuge; c) centrifuging the sample, to generate a centrifuged sample; d) with the aid of the sample handling system, removing at least a portion of the centrifuged sample from the centrifuge; and e) with the aid of the sample handling system, mixing at least a portion of the centrifuged sample with the diluent to generate a diluted sample, wherein the diluted sample comprises bodily fluid at a second concentration, and the second concentration of bodily fluid is one-half~~, one-third, one-quarter, one-tenth,~~ or less of the first concentration of bodily fluid; and, f) with the aid of the sample handling system, transferring at least a portion of the diluted sample to the first and the second fluidically isolated vessels.

**[00233]** In some embodiments, provided herein is a method of preparing a biological sample, comprising: a) introducing a biological sample and at least one isolated vessel into a sample processing device comprising a centrifuge and a sample handling system; b) with the aid of the sample handling system, introducing at least a portion of the biological sample into the centrifuge, wherein the centrifuge comprises one or more cavities and wherein the one or more cavities are configured to receive a total of no more than ~~2 ml, 1.5 ml, 1 ml, 750 microliters,~~ 500 microliters~~, 300 microliters, 200 microliters, 100 microliters, 50 microliters, 25 microliters, 25 microliters, or 10 microliters~~ between all of the one or more cavities; c) centrifuging the sample, to generate a centrifuged sample; d) with the aid of the sample handling system, removing at

least a portion of the centrifuged sample from the centrifuge; and e) with the aid of the sample handling system, transferring centrifuged sample removed from the centrifuge from step d) into the fluidically isolated vessel.

[00233a] According to an aspect, provided herein is a sample processing device comprising: a fluid handling apparatus comprising a first pipette head and a second pipette head, the first pipette head comprising a first pipette nozzle and the second pipette head comprising a second pipette nozzle, wherein at least the first pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a first interface feature and a second interface feature, the first and second interface features each being configured to engage with a nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage simultaneously the first interface feature of the sample processing component with the first pipette nozzle and the second interface feature of the sample processing component with the second pipette nozzle and to transport the sample processing component from a first location to a second location in the device.

[00233b] According to an aspect, herein provided is a method for transporting a sample processing component in a sample processing device, the method comprising: engaging the sample processing component with at least a first nozzle and a second nozzle of a fluid handling apparatus, the fluid handling apparatus comprising at least a first pipette head and a second pipette head, the first pipette head comprising the first nozzle and the second pipette head comprising the second nozzle, and wherein the sample processing component is at a first location in the device when engaged by the first and second nozzle; and transporting by the fluid handling apparatus the engaged sample processing component to a second location in the device.

[00233c] According to an aspect, herein provided is a sample processing device comprising: a cuvette comprising a first pick-up interface and a second pick-up interface, each interface being configured to engage with a nozzle of a fluid handling apparatus and a first cavity and a second cavity, each of the first and second cavity being configured to accept a fluid; a pipette tip; and a fluid handling apparatus comprising a first nozzle and a second nozzle, wherein the fluid handling apparatus is operable to: engage simultaneously the first pick-up interface of the cuvette with the first nozzle and the second pick-up interface of the cuvette with the second nozzle, transport the cuvette from a first location in the device to a second location in the device when the first pick-up interface is engaged with the first nozzle and the second pick-up interface is engaged with the second nozzle, engage the pipette tip with the first nozzle, and aspirate fluid into and or dispense fluid out of the pipette tip when the pipette tip is engaged by the first nozzle.

[00233d] According to an aspect, provided herein is a method of handling components in a sample processing device comprising a fluid handling apparatus, the method comprising:

engaging a pipette tip with a first nozzle of the fluid handling apparatus, the fluid handling apparatus comprising at least the first nozzle and a second nozzle; disengaging the pipette tip from the first nozzle; engaging simultaneously a first pick-up interface of a cuvette with the first nozzle and a second pick-up interface of the cuvette with the second nozzle, wherein the cuvette comprises the first pick-up interface and the second pick-up interface, each interface being configured to engage a nozzle of the fluid handling apparatus, and at least a first cavity and a second cavity, each cavity being configured to accept a fluid; and disengaging the cuvette from the first and second nozzle.

[00233e] According to an aspect, provided herein is a method of processing a biological sample, comprising: introducing a sample having a volume of 500 microliters or less into a sample processing device.

[00233f] According to an aspect, provided herein is a biological sample processing system comprising: a sample processing device.

**[00234]** In some embodiments, in an assay station described above or elsewhere herein, the assay station is configured to support multiple components. The components may comprise, for example, any one or more of: i) a biological sample; ii) any number of fluidically isolated assay units (for example, at least a first, a second, and a third fluidically isolated assay unit); iii) any number of fluidically isolated reagent units (its (for example, at least a first, a second, and a third fluidically isolated reagent unit); iv) reagents to support any number of immunoassays; v) reagents to support any number of general chemistry assays; vi) reagents to support any number of cytometry assays; vii) reagents to support any number of nucleic acid assays; viii) reagents to perform any number of luminescent assays; ix) any number of absorbance, turbimetric, or colorimetric assays; x) any number of fluidically isolated vessels; or xi) two or more fluidically isolated vessels which are physically linked.

**[00235]** In some embodiments, an assay station described above or elsewhere herein that is configured to support multiple components may contain the components.

**[00236]** In some embodiments, a sample processing device described above or elsewhere herein that contains an assay station receiving location may also contain an assay station. In some embodiments, in a sample processing device described above or elsewhere herein that contains an assay station, the assay station may be located in an assay station receiving location. In some embodiments, a sample processing device described above or elsewhere herein that is configured to receive an assay station may contain an assay station.

**[00237]** In some embodiments, an assay station or cartridge described above or elsewhere herein may be configured to support a biological sample of no greater than 100 ml, 50 ml, 30 ml, 20 ml, 10 ml, 5 ml, 2 ml, 1.5 ml, 1 ml, 750 microliters, 500 microliters, 400 microliters, 300 microliters, 200 microliters, 100 microliters 75 microliters, 50 microliters, 40 microliters, 30

microliters, 20 microliters, 10 microliters, 5 microliters, 3 microliters, or 1 microliter.

**[00238]** In some embodiments, an assay station or cartridge described above or elsewhere herein may be configured to support a sample collection unit.

**[00239]** In some embodiments, a sample handling system described above or elsewhere herein may be configured to any one or more of: i) transfer at least a portion of a biological sample to or between one or more assay units, cuvettes, tips, or other vessels; ii) transfer any one or more assay units, cuvettes, tips, or other vessels between (to or from) an assay station and a detection station; iii) transfer any one or more assay units, cuvettes, tips, or other vessels between (to or from) an assay station and a cytometry station; iv) transfer any one or more assay units,