WHAT IS CLAIMED IS:

1. A microfluidic system comprising:

a body structure comprising

(a) a first outer layer forming a first side of the body structure;

(b) a second outer layer forming a second side of the body structure;

(c) a microfluidic assembly comprising at least a first substrate layer and disposed between the first outer layer and the second outer layer;

(d) a first port disposed through the first outer layer and in fluid communication with the microfluidic assembly; and

(e) a second port disposed through either the first outer layer or the second outer layer and adapted to be attached to a vacuum source such that a fluid flow path is defined from the first port to the second port through the microfluidic assembly;

wherein the microfluidic assembly comprises:

(i) a reaction chamber manifold and a waste reservoir; and

(ii) two or more fluid flow paths between the reaction chamber manifold and the waste reservoir, wherein each fluid flow path comprises at least one reaction chamber comprising a dried film, a paper, or a gel comprising one or more test reagents, and wherein the at least one reaction chamber is adapted for an optical measurement of absorbance or transmittance;

wherein the reaction chamber manifold is on a sample supply inlet of each of the two or more fluid flow paths;

wherein the reaction chamber manifold on the sample supply inlet of each of the two or more fluid flow paths has a volume greater than the volume of the at least one reaction chamber; and

wherein the waste reservoir has a volume greater than the volume of the at least one reaction chamber.

~~2. The system of claim 1, wherein the body structure further comprises an absorbent pad in fluid communication with the first port and adapted to accept an aqueous sample.~~

~~3. The system of claim 2, wherein the absorbent pad comprises a compressed cellulose sponge.~~

~~4. The system of any one of claims 1-3, wherein the first reservoir further comprises an absorbent material.~~

2. The system of claim 1, further comprising:

at least one light source that operatively emits light towards the at least one reaction chamber;

at least one light detector that operatively detects light;

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~~5. The system of any one of claims 1-4, wherein the second reservoir further comprises an absorbent material.~~

~~6. The system of any one of claims 1-5, wherein the second port further comprises a hydrophobic.~~

at least one digital processor; and at least one memory storing instructions that, when executed by the at least one digital processor, cause the at least one digital processor to:

calculate when a chemical reaction begins in the at least one reaction chamber based on data obtained by the at least one light detector from the at least one reaction chamber; and

wherein the calculating of when the chemical reaction begins is based on light data derived from light signals detected by the light detector at least (i) prior and (ii) after at least one of the one or more test reagents of the least one reaction chamber is wetted by a sample.

3. The system of claim 2, wherein the instructions when executed, further causes the at least one digital processor to calculate reaction status based on data collected and thereby track the chemical reaction from the chemical reaction beginning to the chemical reaction end, which includes one or more of (a) calculating a start time of a measurement prior, during, and after wetting of the at least one of the one or more test reagents; and (b) calculating reaction status based on additional data on the progression of the chemical reaction, which for the chemical reaction in the at least one reaction chamber develops over time.

4. The system of claim 2, wherein the instructions when executed, further cause the at least one digital processor to calculate an early prediction of a reaction result before the reaction in the at least one chamber reaches a steady-state.

5. The system of claim 2, wherein the instructions when executed, further cause the at least one digital processor to calculate analysis of the reaction using light signal(s) based on time-series data.

6. The system of claim 2, wherein the instructions when executed, further cause the at least one processor to, one or more of: start, begin measurement of, and calculate analysis of:

the reaction using light signal(s) at an optimal time(s), the optimal time(s) dependent on each reagent or the reaction based on time data.

7. The system of claim 1, wherein the microfluidic assembly comprises microfluidic channels that have a cross-sectional dimension of 0.1 microns to 1000 microns.

~~8. The system of any one of claims 1-7, further comprising an optical detection system comprising a light source and a detector configured to measure absorbance by or reflectance from at least one of the reaction chambers.~~

~~9. The system of claim 8, wherein the optical detection system comprises a spectrophotometer or colorimeter comprising a light emitting diode (LED) source and a detector configured to measure transmittance or absorbance through at least one of the reaction chambers.~~

~~10. The system of claim 9 wherein the spectrophotometer comprises a plurality of LED sources and detectors configured to measure transmittance through a plurality of reaction chambers.~~

~~11. The system of claim 8, wherein the optical detection system comprises a light source, a wave guide adapted to split light emitted from the light source into a plurality of beams and direct the beams onto a plurality of reaction chambers, and a plurality of detectors, wherein a single detector is registered to each reaction chamber.~~

~~12. The system of any one of claims 8-11, wherein at least one detector is configured to measure transmittance or absorbance of at least one wavelength selected from the group consisting of 415 nm, 445 nm, 450 nm, 480 nm, 500 nm, 515 nm, 550 nm, 570 nm, 590 nm, 600 nm, 630 nm, 650 nm, 680 nm, 910 nm, and alternatively or additionally to measure transmittance or absorbance of all wavelengths in the range of 350 nm to 1050 nm or other range of wavelengths, as a single optical signal integrated over the range or those wavelengths..~~

~~13. The system of any one of claims 1-12, wherein the system further comprises a vacuum source adapted to apply a vacuum pressure to the second port.~~

14. The system of any one of claims 1-13, wherein the system further comprises a holder having an engagement device, wherein the engagement device is configured to hold the body structure in a retracted position and an extended position, wherein the first port is housed within the holder in the retracted position and extended from the holder in the extended position.

15. The system of claim 14, wherein the engagement device forms a slidable engagement between the holder and the body structure.

16. The system of claim 14 or 15, wherein the holder is configured to position the body structure within the spectrophotometer wherein at least one reaction chamber is aligned with at least on detector.

17. A microfluidic assembly comprising
a body structure comprising

(a) a first outer layer forming a first side of the body structure;

(b) a second outer layer forming a second side of the body structure;

(c) a microfluidic assembly comprising at least a first substrate layer and disposed between the first outer layer and the second layer;

(d) a first port disposed through the first outer layer and in fluid communication with the microfluidic assembly; and

(e) a second port disposed through either the first outer layer or the second outer layer and adapted to be attached to a vacuum source such that a fluid flow path is defined from the first port to the second port through the microfluidic assembly;

wherein the microfluidic assembly comprises:

(i) a first reservoir and a second reservoir; and

(ii) two or more fluid flow paths between the first reservoir and the second reservoir, wherein each fluid flow path comprises at least one reaction chamber comprising a dried film, a paper, or a gel comprising one or more colorimetric test reagents, and wherein the reaction chambers are adapted for an optical measurement of absorbance or transmittance;

wherein the first reservoir has a volume greater than the volume of a reaction chamber; and

~~wherein the second reservoir has a volume greater than the volume of a reaction chamber.~~

8. The system of claim 1, wherein the microfluidic assembly comprises microfluidic channels having a cross-sectional dimension of about 300 microns to about 800 microns.

9. The system of claim 1, wherein the microfluidic assembly is removeably attachable to clothing.

10. The system of claim 1, comprising a handheld holder, the handheld holder having a frame or a housing.

11. The system of claim 10, wherein the handheld holder is collapsible to a flat configuration.

12. The system of claim 10, wherein the handheld holder has a longitudinal axis and is expandable by applying a force perpendicular to the longitudinal axis, which expansion allows the handheld holder to one or more of: (i) receive, (ii) contain an (iii) test a reaction in:

the at least one reaction chamber.

13. The system of claim 10, wherein the handheld holder has a longitudinal axis along which the at least one reaction chamber is adapted to be slidably engaged and slides away from a readable position when a sample is taken and slides into the readable position for reaction measurement.

14. The system of claim 1, wherein one or more of (i) sample flows into and (ii) reactions begin at:

multiple of the at least one chamber(s) so as to allow one or more of: testing, predictive analysis, and predictive result display.

~~25. The system of any one of claims 1-24, wherein the holder has a longitudinal axis along which the at least one reaction chamber is adapted to be slidably engaged and slides away from a readable position when a sample is taken in slides into the readable position for reaction measurement.~~

~~26. A method that comprises using a system of any one of claims 1-25, further comprising: (i) detecting at least one reaction chamber, when a (or each separate) chemical reaction begins; (ii) tracking a chemical reaction from its beginning to its end, which includes one or more of (a) precisely timing a start time of a measurement (optionally at a standard optimal point in time); and (b) gathering of additional data on the progression of a chemical reaction, which for the chemical reaction in the at least one reaction chamber develops over (minutes or hours of) time rather than instantly; (iii) providing an early prediction of a reaction result before a reaction in the at least one chamber reaches a steady-state (or optionally equilibrium); (iv) analyzing a reaction using light signal(s) at an optimal time, the optimal time(s) dependent on each reagent or each reaction based on (optionally pre-determined historical (optionally, reaction dependent))time data.~~