CLAIMS

1. A sample holder, comprising:

a first member comprising a first retaining mechanism configured to retain a first substrate comprising a sample, the first retaining mechanism configured to retain the first substrate disposed in a first plane, the sample disposed in a first region of the first substrate;

a second member comprising a second retaining mechanism configured to retain a second substrate comprising a reagent medium disposed in a second plane and disposed in a second region of the second substrate;

an alignment mechanism connected to one or both of the first member and the second member, and configured to optically align the first region with the second region along the first plane and/or the second plane such that the sample contacts at least a portion of the reagent medium when the first region and the second region are aligned and when the first substrate and the second substrate are separated by a threshold distance;

an adjustment mechanism configured to move the second member along the axis orthogonal to the second plane; and

an image capture device configured to capture, responsive to the alignment and during a time when the sample is in contact with at least a portion of the reagent medium, an image of the first region and the second region.

2. The sample holder of claim 1, further comprising a computing device communicatively coupled to the image capture device and to the sample holder, the computing device comprising a display, a data processor, and a non-transitory computer readable storage medium storing computer readable and executable instructions, which when executed cause the data processor to adjust the location of the first substrate relative to the second substrate to cause all or the portion of the first region to be aligned with the second region.

3. The sample holder of any one of the preceding claims, further comprising an LED illumination source.

4. The sample holder of any one of the preceding claims, wherein the image capture device is positioned inferior to the second member.

5. The sample holder of any one of the preceding claims, wherein the image capture device is disposed on a track configured to move the image capture device along the track.

6. The sample holder of any one of the preceding claims, wherein the alignment mechanism comprises a sensor configure to determine a threshold alignment of the first region with the second region.

7. The sample holder of any one of the preceding claims, further comprising a controller configured to control the alignment mechanism, the adjustment mechanism, and/or the image capture device.

8. The sample holder of claim 7, wherein the controller is configured to communicate with a user interface, the user interface configured to display information about the sample holder.

9. The sample holder of claim 8, wherein the controller is configured to receive a user input from the user interface.

10. The sample holder of any one of the preceding claims, wherein the second member further comprises a spring mechanism configured to couple to at least a portion of an inferior surface of the second substrate.

11. The sample holder of any one of the preceding claims, wherein the second member further comprises a base configured to couple to an inferior surface of the second substrate and retain the second substrate on the second member, wherein the spring mechanism extends in a superior direction from the base.

12. The sample holder of any one of the preceding claims, wherein the spring mechanism is configured to dispose the second substrate along the second plane at an angle different than the base.

13. The sample holder of any one of the preceding claims, wherein the adjustment mechanism is configured to move the second member toward the first member such that the first substrate contacts at least a portion of the reagent medium.

14. The sample holder of any one of the preceding claims, wherein the first substrate contacting the at least a portion of the reagent medium urges the reagent medium in an opposite direction such that the reagent medium is displaced over the second substrate and/or the first substrate as the second member moves toward the first member and the second substrate and the first substrate become substantially parallel.

15. The sample holder of any one of the preceding claims, wherein the adjustment mechanism configured to move the second member toward the first member such that the spring mechanism compresses so that the first substrate, the second substrate, and the base are substantially parallel.