WHAT IS CLAIMED IS:

1. A method including:

receiving a plurality of image sets, each image set of the plurality of image sets including images captured using structured illumination microscopy (SIM) in an optical system at a distance from a subject that differs from the distance from the subject at which images are captured in the other image sets of the plurality of image sets, each image of the plurality of image sets having an associated color channel and an associated grating angle;

isolating a first image set from the plurality of image sets based at least in part on the distance corresponding to the first image set;

measuring a full width at half maximum (FWHM) value corresponding to each image in the first image set, wherein each FWHM value is measured on a center estimation window of each channel and each grating angle;

identifying a minimum FWHM slice based at least in part on an average FWHM value across the images in the first image set;

performing parameter estimation on the identified minimum FWHM slice corresponding to the first image set;

identifying best in-focus parameters based at least in part on the performed parameter estimation corresponding to the first image set;

storing the identified best in-focus parameters based at least in part on the performed parameter estimation corresponding to the first image set;

performing a phase estimate for each image within the first image set;

performing a modulation calculation based at least in part on the identified best in-focus parameters corresponding to the first image set; and

generating a report presenting parameter values corresponding to the optical system, based at least in part on the performed modulation calculation corresponding to the first image set.

2. The method of claim 1, further comprising:

isolating a second image set from the plurality of image sets based at least in part on the distance corresponding to the second image set;

measuring a full width at half maximum (FWHM) value corresponding to each image in the second image set, wherein each FWHM value is measured on a center estimation window of each channel and each grating angle;

identifying a minimum FWHM slice based at least in part on an average FWHM value across the images in the second image set;

performing parameter estimation in the identified minimum FWHM slice corresponding to the second image set;

identifying best in-focus parameters based at least in part on the performed parameter estimation corresponding to the second image set;

storing the identified best in-focus parameters based at least in part on the performed parameter estimation corresponding to the second image set;

performing a phase estimate for each image within the second image set; and

performing a modulation calculation based at least in part on the identified best in-focus parameters corresponding to the second image set;

the generated report being based at least in part on a combination of the performed modulation calculation corresponding to the first image set and the performed modulation calculation corresponding to the second image set.

3. The method of any one or more of claims 1 through 2, the performing parameter estimation in the identified minimum FWHM slice corresponding to the first image set being performed on a center estimation window of the identified minimum FWHM slice.

4. The method of any one or more of claims 1 through 3, further comprising:

comprising comparing parameters in the report against a predefined set of parameter specifications

determining that a parameter in the report deviates from the predefined set of parameter specifications; and

adjusting one or more features in the optical system based at least in part on the determination that a parameter in the report deviates from the predefined set of parameter specifications.

5. The method of any one or more of claims 1 through 4, the generated report including parameter values selected from the group consisting of distances between an objective lens in the optical system and the subject, the channel corresponding to each image of the plurality of images, angle index, modulation, FWHM values, grating spacing, and grating angles.

6. The method of any one or more of claims 1 through 5, further comprising computing phase shift between pairs of images of the first image set, each pair of images of the pairs of images sharing a channel and grating angle, the generated report including the computed phase shifts.

7. The method of claim 6, further comprising:

comparing the computed phase shifts against a predetermined range of phase shifts;

determining that at least one of the computed phase shifts is outside the predetermined range of phase shifts; and

in response to determining that at least one of the computed phase shifts is outside the predetermined range of phase shifts, calculating gain values to correct the phase shifts that are outside the predetermined range of phase shifts.

8. The method of claim 7, further comprising:

establishing new phase shifting voltages based at least in part on the calculated gain values;

applying the new phase shifting voltages to a piezoelectric element, the piezoelectric element to provide phase shifts within the optical system; and

capturing a new image set with the new phase shifting voltages being applied to the piezoelectric element.

9. A processor-readable medium including contents that are configured to cause a computing system to process data by performing the method of any one or more of claims 1 through 8.

10. An apparatus comprising:

a first optical assembly to emit structured illumination toward a target, the first optical assembly including:

a light emitting assembly,

a first phase mask to impart a first pattern to light emitted by the light emitting assembly,

a second phase mask to impart a second pattern to light emitted by the light emitting assembly, and

a phase adjustment assembly to adjust a phase of light structured by the first phase mask and the second phase mask;

a second optical assembly, the second optical assembly including an image sensor to capture images of the target as illuminated by the first optical assembly; and

a processor, the processor to perform the following:

receive a plurality of image sets, each image set of the plurality of image sets including images captured using the second optical assembly at a distance from a subject that differs from the distance from the subject at which images are captured in the other image sets of the plurality of image sets, each image of the plurality of images having an associated color channel and an associated grating angle,

isolate a first image set from the plurality of image sets based at least in part on the distance corresponding to the first image set,

measure a full width at half maximum (FWHM) value corresponding to each image in the first image set, wherein each FWHM value is measured on a center estimation window of each channel and each grating angle,

identify a minimum FWHM slice based at least in part on an average FWHM value across the images in the first image set,

perform parameter estimation on the identified minimum FWHM slice corresponding to the first image set,

identify best in-focus parameters based at least in part on the performed parameter estimation corresponding to the first image set,

store the identified best in-focus parameters based at least in part on the performed parameter estimation corresponding to the first image set,

perform a phase estimate for each image within the first image set,

perform a modulation calculation based at least in part on the identified best in-focus parameters corresponding to the first image set, and

generate a report presenting parameter values corresponding to the optical system, based at least in part on the performed modulation calculation corresponding to the first image set.

11. The apparatus of claim 10, the target including a sample container.

12. The apparatus of any one or more of claims 10 through 11, the first optical assembly further including a grating switcher, the grating switcher to selectively direct or permit light emitted from the light emitting assembly toward the first phase mask or the second phase mask.

13. The apparatus of any one or more of claims 10 through 12, the phase adjustment assembly including a movable reflecting element.

14. The apparatus of claim 13, the phase adjustment assembly further including an actuator to move the movable reflecting element.

15. The apparatus of any one or more of claims 10 through 14, the processor being further to compute phase shift between pairs of images of the first image set, each pair of images of the pairs of images sharing a channel and grating angle.

16. The apparatus of claim 15, the processor further to compare the computed phase shifts against a predetermined range of phase shifts.

17. The apparatus of claim 16, the processor being further to:

determine that at least one of the computed phase shifts is outside the predetermined range of phase shifts; and

in response to determining that at least one of the computed phase shifts is outside the predetermined range of phase shifts, calculate gain values to correct the phase shifts that are outside the predetermined range of phase shifts.

18. The apparatus of claim 17, the processor further to establish new phase shifting voltages based at least in part on the calculated gain values, the phase adjustment assembly including a piezoelectric element to adjust the phase of light structured by the first phase mask and the second phase mask, the new phase shifting voltages to activate the piezoelectric element to provide phase shifts that are closer to the predetermined range of values.

19. The apparatus of any one or more of claims 10 through 18, further comprising a targeting device including a preformed optical pattern, the targeting device to enable the first optical assembly to emit structured illumination toward the

preformed optical pattern, the targeting device to enable the image sensor to capture images of the preformed optical pattern as illuminated by the first optical assembly.