WHAT IS CLAIMED IS:

1. A method including:

receiving a plurality of images captured using structured illumination microscopy (SIM) in an optical system, each image of the plurality of images having a first field of view;

defining a window, the window defining a second field of view representing a portion of the first field of view such that the second field of view is smaller than the first field of view;

moving the window in relation to each image of a plurality of images;

capturing a plurality of sub-tiles from each image of the plurality of images while moving the window in relation to each image of the plurality of images, each sub-tile of the plurality of plurality of sub-tiles representing a portion of the corresponding image of the plurality of images, the portion represented by each sub-tile of the plurality of sub-tiles being defined by the second field of view at a position corresponding to a moment at which the sub-tile of the plurality of sub-tiles is captured;

estimating parameters associated with each sub-tile of the plurality of sub-tiles, the parameters including two or more parameters selected from the group consisting of intensity modulation, phase modulation, incidence angle, diffraction angle, grating angle, illumination angle, illumination peak angle fringe angle, illumination peak spacing, fringe spacing, graduation spacing, grating spacing, local SIM illumination pattern periodicity, phase offset, and phase deviation;

estimating, for each wavelength channel, a full width at half maximum (FWHM) value associated with each sub-tile of the plurality of sub-tiles; and

storing the estimated parameters and FWHM values in a predetermined format.

2. The method of claim 1, further comprising estimating a center window parameter, the center window parameter corresponding to a central region within the first field of view.

3. The method of claim 2, further comprising estimating a distortion model based at least in part on a combination of the estimated parameters and FWHM values stored in the predetermined format and the estimated center window parameter, the estimating the distortion model including subtracting the estimated center window parameter from the estimated parameters and FWHM values stored in the predetermined format.

4. The method of claim 3, the estimating the distortion model including fitting a quadratic surface function to the result of the subtracting.

5. The method of any one or more of claims 3 through 4, further comprising validating the estimated distortion model by:

calculating a coefficient of determination for the estimated distortion model; and

comparing the calculated coefficient of determination to a predetermined threshold value.

6. The method of any one or more of claims 3 through 5, further comprising generating a two-dimensional image based at least in part on the estimated distortion model, the two-dimensional image including representations indicating where distortions occur in the optical system.

7. The method of any one or more of claims 3 through 6, further comprising:

capturing a subsequent plurality of images using SIM in the optical system; and

generating a high-resolution image based at least in part on the plurality of images, the generating the high-resolution image

including adjusting data from the subsequent plurality of images based at least in part on the estimated distortion model.

8. The method of any one or more of claims 1 through 7, the plurality of captured images being images of an optical target, the optical target including a dye, the capturing of the plurality of images including exciting molecules in the dye, the dye having a mean emission wavelength, exciting molecules in the dye including emitting an excitation light toward the dye, the excitation light having a wavelength that is substantially longer than the mean emission wavelength of the dye.

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 images captured using the image sensor, each image of the plurality of images having a first field of view,

define a window, the window defining a second field of view representing a portion of the first field of view such that the second field of view is smaller than the first field of view,

move the window in relation to each image of a plurality of images,

capture a plurality of sub-tiles from each image of the plurality of images while moving the window in relation to each image of the plurality of images, each sub-tile of the plurality of plurality of sub-tiles representing a portion of the corresponding image of the plurality of images, the portion represented by each sub-tile of the plurality of sub-tiles being defined by the second field of view at a position corresponding to a moment at which the sub-tile of the plurality of sub-tiles is captured,

estimate parameters associated with each sub-tile of the plurality of sub-tiles, the parameters including two or more parameters selected from the group consisting of intensity modulation, phase modulation, incidence angle, diffraction angle, grating angle, illumination angle, illumination peak angle fringe angle, illumination peak spacing, fringe spacing, graduation spacing, grating spacing, local SIM illumination pattern periodicity, phase offset, and phase deviation,

estimate, for each wavelength channel, a full width at half maximum (FWHM) value associated with each sub-tile of the plurality of sub-tiles, and

store the estimated parameters and FWHM values in a predetermined format.

11. The apparatus of claim 10, the processor further to estimate a center window parameter, the center window parameter corresponding to a central region within the first field of view.

12. The apparatus of claim 11, the processor further to estimate a distortion model based at least in part on a combination of the estimated parameters and FWHM values stored in the predetermined format and the estimated center window parameter.

13. The apparatus of claim 12, the processor further to estimate the distortion model by including subtracting the estimated center window parameter from the estimated parameters and FWHM values stored in the predetermined format.

14. The apparatus of claim 13, the processor further to estimate the distortion mode by fitting a quadratic surface function to the result of the subtracting.

15. The apparatus of claim 14, the processor further to estimate the distortion mode by fitting the quadratic surface function to the result of the subtracting comprising using a shrinkage estimator.

16. The apparatus of any one or more of claims 12 through 15, the processor further to validate the distortion model by:

calculating a coefficient of determination for the estimated distortion model, and

comparing the calculated coefficient of determination to a predetermined threshold value.

17. The apparatus of any one or more of claims 12 through 16, the processor further to:

estimate a phase offset, and

apply the phase offset to the estimated distortion model.

18. The apparatus of any one or more of claims 12 through 17, the processor further to generate a two-dimensional image based at least in part on the estimated distortion model, the two-dimensional image including representations indicating where distortions occur in the optical system.

19. The apparatus of any one or more of claims 11 through 18, the processor further to:

capture a subsequent plurality of images using SIM in the optical system, and

generate a high-resolution image based at least in part on the plurality of images, the generating the high-resolution image including adjusting data from the subsequent plurality of images based at least in part on the estimated parameters and FWHM values stored in the predetermined format.