CLAIMS:

1. A method for fabricating one or more elements in a multi-lens column, the method comprising:

dispensing drops of ultraviolet (UV)-curable liquid by an inkjet on a substrate;

forming a non-uniform liquid film by spreading and merging of said inkjetted drops;

locally heating said film;

curing said film by exposing said film to UV light, wherein said cured film together with said substrate form an element of said multi-lens column; and

performing optical metrology on said cured film and said substrate.

2. The method as recited in claim 1, wherein said spreading and merging of said inkjetted drops is enabled by a superstrate.

3. The method as recited in claim 1, wherein said optical metrology is performed simultaneously with said formation of said non-uniform liquid film.

4. The method as recited in claim 1, wherein said element of said multi-lens column formed from said cured film and said substrate correct optical aberrations of one or more other elements of said multi-lens column.

5. The method as recited in claim 1, wherein said local heating of said film is performed using one or more of the following: an infrared light source projected using a digital micromirror device array, distributed microheaters, and an infrared laser source mounted on a stage.

6. A method for fabricating one or more elements in a multi-lens column, the method comprising:

depositing a cured film on a surface of an imprecise lens to correct external aberrations or inherent aberrations using a nanoscale precise programmable profiling process, wherein said nanoscale precision programming profiling process comprises:

dispensing drops of ultraviolet (UV)-curable liquid by an inkjet on a substrate;

forming a non-uniform liquid film by spreading and merging of said inkjetted drops;

locally heating said film; and

curing said film by exposing it to UV light; ~~and~~

transferring a profile of said cured film into said substrate by dry etch, wherein said substrate with said transferred profile of said cured film forms an element of said multi-lens column; and

performing optical metrology on said substrate.

7. The method as recited in claim 6, wherein said spreading and merging of said inkjetted drops is enabled by a superstrate.

~~8. The method as recited in claim 6, wherein said optical metrology is performed simultaneously with said formation of said non-uniform liquid film.~~

~~9. The method as recited in claim 6, wherein said element of said multi-lens column formed from said cured film and said substrate correct optical aberrations of one or more other elements of said multi-lens column.~~

~~10~~8. The method as recited in claim 6, wherein said local heating of said film is performed using one or more of the following: an infrared light source projected using a digital micromirror device array, distributed microheaters, and an infrared laser source mounted on a stage.

~~11~~9. A multi-lens column, comprising:

one or more optical elements fabricated using a nanoscale precision programmable profiling process and a dry etch process, wherein said nanoscale precision programming profiling process comprises:

dispensing drops of ultraviolet (UV)-curable liquid by an inkjet on a substrate;

forming a non-uniform liquid film by spreading and merging of said inkjetted drops;

locally heating said film; and

curing said film by exposing it to UV light; and

transferring a profile of said cured film into said substrate by said dry etch process, wherein said substrate with said transferred profile of said cured film forms an optical element of said multi-lens column.

~~12~~10. The multi-lens column as recited in claim ~~11~~9, wherein said one or more optical elements comprise corrector plates that correct one or more of the following: on-axis aberrations, off-axis aberrations, chromatic aberrations, and polarization aberrations.

~~13~~11. The multi-lens column as recited in claim ~~11~~9, wherein said one or more optical elements are used in one or more of the following: semiconductor lithography, imaging, microscopy, inspection, characterization, metrology, and cameras.

~~14. The multi-lens column as recited in claim 11, wherein said one or more optical elements are used in one or more of the following: darkfield imaging, lightfield imaging, confocal microscopy, and high numerical aperture objectives.~~

~~15~~12. The multi-lens column as recited in claim ~~11~~9, wherein overall aberrations in said multi-lens column are better than λ/10 peak-to-valley (P-V) optical path difference error, wherein said λ corresponds to a wavelength of light.

~~16~~13. The multi-lens column as recited in claim ~~11~~9, wherein overall aberrations in said multi-lens column are better than λ/30 root mean square (RMS) optical path difference error, wherein said λ corresponds to a wavelength of light.

~~17~~14. The multi-lens column as recited in claim ~~11~~9, wherein a quality of optical image formation of said one or more optical elements has a Strehl ratio greater than 0.95.

~~18~~15. The multi-lens column as recited in claim ~~11~~9, wherein a numeral aperture of said one or more optical elements is greater than 0.90.

~~19~~16. The multi-lens column as recited in claim ~~11~~9, wherein said one or more optical elements is made of one of the following materials: SiO_2, UV-grade fused silica, CaF_2, MgF_2, Al_2O_3, and ZnS.

~~20~~17. The multi-lens column as recited in claim ~~11~~9, wherein said one or more optical elements are designed, fabricated and assembled after other elements in said multi-lens column are assembled, wherein said one or more optical elements compensate for aberrations of said other assembled elements.

~~21. The multi-lens column as recited in claim 20, wherein said one or more optical elements compensate for aberrations of said other assembled elements.~~

~~22~~18. The multi-lens column as recited in claim ~~1~~9, wherein a field of view of said multi-lens column is greater than 100 micrometers in diagonal width, wherein said multi-lens column is used for imaging.

~~23~~19. The multi-lens column as recited in claim ~~1~~9, wherein a field of view of said multi-lens column is greater than 1 millimeter in diagonal width, wherein said multi-lens column is used for imaging.

~~24~~20. The multi-lens column as recited in claim ~~1~~9, wherein a field of view of said multi-lens column is greater than 250 square millimeters, wherein said multi-lens column is used for projection lithography.

~~25~~21. The multi-lens column as recited in claim ~~1~~9, wherein said one or more optical elements is made of a material that is unetchable in a reactive ion etching chamber, wherein a sacrificial material is deposited on said unetchable material.

~~26~~22. The multi-lens column as recited in claim ~~25~~21, wherein said unetchable material has a textured interface with said sacrificial material.

~~27~~23. The multi-lens column as recited in claim ~~25~~21,~~-~~ wherein said sacrificial material and said unetchable material are polished at substantially similar rates.

~~28. The multi-lens column as recited in claim 25, wherein said sacrificial material comprises one of the following: Si_xO_y, Si_xN_y and $Si_xO_yN_z$.~~

~~29~~24. The multi-lens column as recited in claim ~~25~~21, wherein said sacrificial material has a refractive index substantially similar to said unetchable material.