Claims

What is claimed is:

1. A system comprising:
   an array of reaction chambers; and
   a waveguide that delivers excitation light to at least a portion of the array of the reaction chambers,
   wherein a vertical extent of an optical mode of the waveguide is modulated to adjust confinement of light within, and along a length of, the waveguide.

2. The system of claim 1, wherein the vertical extent of the optical mode is modulated by changing a thickness of a waveguide core layer along the length of the waveguide.

3. The system of claim 1, wherein the vertical extent of the optical mode is modulated by changing a refractive index of a waveguide core or cladding material along the length of the waveguide.

4. The system of claim 2, wherein the thickness of the waveguide core layer along the length of the waveguide is changed by transferring a topography of a photoresist layer.

5. The system of claim 1, comprising:
   a plurality of waveguides having uniform widths; and
   a plurality of dummy structures having tapered widths,
   wherein the plurality of waveguides and the plurality of dummy structures are disposed alternatively.

6. The system of claim 5, wherein the plurality of waveguides and the plurality of dummy structures are in a waveguide core layer.

7. A system comprising:
   an array of reaction chambers; and
   a waveguide that delivers excitation light to at least a portion of the array of the reaction chambers,
   wherein a distance between the waveguide and the reaction chambers is modulated to compensate for waveguide losses.

8. The system of claim 7, wherein a thickness of a cladding layer of the waveguide is controlled to modulate the distance between the waveguide and the reaction chambers.

9. The system of claim 7, comprising:
a plurality of waveguides having uniform widths; and
a plurality of dummy structures having tapered widths,
wherein the plurality of waveguides and the plurality of dummy structures are disposed alternatively.

10. The system of claim 7, comprising:
a plurality of waveguides having tapered widths; and
a plurality of dummy structures having tapered widths,
wherein the plurality of waveguides and the plurality of dummy structures are disposed alternatively.

11. The system of claim 7, comprising:
a plurality of waveguides having tapered widths in a first direction; and
a plurality of dummy structures having tapered widths in a second direction opposite to the first direction,
wherein the plurality of waveguides and the plurality of dummy structures are disposed alternatively.

12. A method comprising:
providing a waveguide to deliver excitation light to an array of reaction chambers; and
modulating a vertical extent of an optical mode of the waveguide to adjust confinement of light within, and along a length of, the waveguide.

13. The method of claim 12, wherein the modulating includes changing a thickness of a waveguide core layer along the length of the waveguide.

14. The method of claim 12, wherein the modulating includes changing a refractive index of a waveguide core or cladding material.

15. A method comprising:
providing a waveguide to deliver excitation light to an array of reaction chambers; and

modulating a distance between the waveguide and the reaction chambers.

16. The method of claim 16, wherein the modulating includes controlling a thickness of a cladding layer of the waveguide.

17. The method of claim 17, wherein controlling the thickness of the cladding layer of the waveguide includes providing the cladding layer with a tapered thickness by planarizing a material for the cladding layer on a modulated waveguide pattern.

18. The method of claim 17, wherein controlling the thickness of the cladding layer of the waveguide includes providing the cladding layer with a tapered thickness by depositing a material for the cladding layer on a modulated waveguide pattern.

19. The method of claim 17, wherein controlling the thickness of the cladding layer of the waveguide includes providing the cladding layer with a tapered thickness by transferring a topography of a photoresist layer to the cladding layer.

20. A method comprising:
forming an array of reaction chambers;
forming a waveguide to deliver excitation light to the reaction chambers; and
modulating the waveguide to deliver as close to an equal amount of excitation light to each reaction chamber.

21. The method as claimed in claim 21, wherein the modulating includes modulating a vertical extent of the optical mode of the waveguide.

22. The method as claimed in claim 21, wherein the modulating includes modulating a thickness along its length of the waveguide.

23. The method as claimed in claim 21, wherein the modulating includes modulating a distance along its length of the waveguide from each reaction chamber.

24. A method comprising:
exciting with excitation light delivered through a waveguide a sample within each of a plurality of reaction chambers,
wherein the waveguide is modulated such that a substantially same amount of light is delivered to each reaction chamber.