Claims:

1. A method for writing, by at least one inkjet writing print head, a unique code to polymer memory strands dispensed on at least one writing spot on a wafer array, the head or nozzle writing the same code to a plurality of polymer memory strands dispensed on the at least one spot.

2. The method of claim 1, comprising the following steps:

a) loading the desired spot to be written with a starter polymer or DNA attached at one end to the desired spot;

b) washing the surface of the spot;

c) positioning an Add "0" or Add "1" inkjet nozzle having corresponding Add "0" and Add "1" reagents over the desired spot to be written corresponding to the unique code, wherein the Add "0" and Add "1" reagents comprise a monomer or oligomer encoding a "0" or "1";

d) causing the inkjet nozzle to release a droplet of the corresponding Add "0" or Add "1" reagent onto the spot, thereby writing a bit or portion of the unique code to the DNA or polymer memory strings (or strands) associated with the spot; and

e) washing the surface of the spot.

3. The method of claim 2 further comprising:

f) causing the inkjet nozzle to release a droplet of deblock/adapter reagent onto the spot;

g) washing the surface of the spot; and

h) repeating steps (c) through (g) until the unique code has been written in the memory string at the spot.

4. The method of claim 2 further comprising:

f) applying to substrate an Add "0" or Add "1" reagent which will add only to polymer memory strands not modified by step c);

g) repeating steps (b) through (f) until the unique code has been written in the memory string at the spot.

5. The method of claim 1:
comprising simultaneously writing, by a plurality of the writing print heads, unique codes to polymer memory strands dispensed on a plurality of writing spots on the wafer array; or wherein the writing print head comprises a piezoelectric print head.

6. The method of claim 1, wherein the polymer memory strands are DNA.

7. The method of claim 1, further comprising flowing a cleaving fluid over the spot thereby removing the memory strings from the spot and flowing the memory strings from the spot into a collection or storage container for later reading.

8. The method of claim 1 for simultaneously writing, by a plurality of writing print heads, unique codes to polymer memory strands dispensed on a plurality of writing spots on a wafer array, each head or nozzle writing the same code to a plurality of DNA memory strands dispensed on a given spot, the method comprising:
loading the desired spot to be written with starter polymer or DNA onto the desired spots;
washing the surface of the wafer array;
positioning an Add “0” or Add “1” inkjet nozzle having the corresponding Add “0” and Add “1” reagents over desired spot(s) to be written;
causing the inkjet nozzle to release a droplet of the corresponding Add “0” or Add “1” reagent onto the spot, thereby writing a bit or code to the DNA or polymer memory strings (or strands) associated with the spot on the wafer array;
washing the surface of the wafer array;
causing the inkjet nozzle to release a droplet of deblock/adapter reagent onto the spot;
washing the surface of the wafer array;
when the code writing is complete for all the memory strings at all the spots on the wafer array;

washing the surface of the wafer array with a cleaving fluid which removes the memory strings from the spots; and

flowing the memory strings from the wafer array into a collection or storage container for later reading.

9. The method of claim 1 wherein the at least one spot comprises a metal oxide surface which accepts phosphonate moieties that may be linked to DNA starter strands, wherein the spots are surrounded by hydrophobic regions.

10. The method of claim 9 wherein the metal oxide is HfO_2 and the hydrophobic regions comprise perfluoroalkyl moieties.

11. The method of claim 8 wherein:
    (i) the washing may be performed by flowing a washing fluid into an input port or manifold fluidically connected to one side of the wafer array causing the fluid to flow across the wafer surface and to exit an output port or manifold on an opposite side of the wafer;
    (ii) the washing may be performed by providing a washing print head with a nozzle which dispenses a predetermined amount of washing fluid to each desired spot on the wafer array surface;
    (iii) the starter strands or strings may be loaded and attached to the spots by providing a washing print head with a nozzle which dispenses a predetermined amount of starter strands in a fluid to each desired spot on the wafer array surface;
    (iv) the starter strings are attached to the spots, then dried and then rehydrated before use in the inkjet printer; or
    (v) after writing the codes, the coded polymers attached to the spots on the array are then dried and stored, and then rehydrated and removed for reading or storing.

12. The method of claim 7, wherein after writing is completed, unloading the coded polymer memory strands.

13. The method of claim 6 comprising synthesizing a DNA polymer using topoisomerase-mediated ligation, comprising:

(i) reacting a double-stranded acceptor DNA with a topoisomerase charged with a double-stranded DNA oligomer covalently bound to the topoisomerase),

wherein a strand of the acceptor DNA has a 5’ overhang,

wherein the oligomer optionally comprises an informational sequence, a topoisomerase recognition sequence, and 5’ overhangs on both strands,

wherein the 5’ overhang of the strand of the oligomer that does not bear the topoisomerase (“bottom strand”) is complementary to the 5' overhang of the acceptor DNA but is not complementary to the 5’ overhang of the strand bearing the topoisomerase (“top strand”) of the oligomer,

wherein the 5’ end of the strand bearing the topoisomerase (“top strand”) of the oligomer and 5’ end of the acceptor DNA are not protected, e.g., not phosphorylated (i.e., 5’-OH), and

wherein the topoisomerase charged with a double-stranded DNA oligomer is delivered to the location of the acceptor strand by a piezo-electric inkjet nozzle;

(ii) reacting the acceptor DNA thus extended in step (i) with a topoisomerase charged with a further double-stranded DNA oligomer,

wherein the further oligomer optionally comprises an informational sequence that is the same as or is different from any informational sequence in the oligomer of step (i), a topoisomerase recognition sequence, and 5’ overhangs on both strands,

wherein the 5’ overhang of the strand of the further oligomer not bearing the topoisomerase (“bottom strand”) is complementary to the 5' overhang of the extended acceptor DNA but is not complementary to the 5’ overhang of the strand of the further oligomer bearing the topoisomerase (“top strand”), and

wherein the 5’end of the strand bearing the topoisomerase (“top strand”) of the further oligomer is not protected, e.g., not phosphorylated (i.e., 5’-OH); and

(iii) repeating steps (i) and (ii) until the desired nucleotide sequence is obtained.

14. The method of claim 13 wherein there is a washing step after step (i) and after step (ii).

15. A reagent comprising a topoisomerase charged with a double-stranded DNA oligomer in a buffer solution comprising a viscosity modifying agent.