

WHAT IS CLAIMED IS:

1. A composition, comprising:
 - first and second electrodes separated from one another by a space;
 - a bridge spanning the space between the first and second electrodes,
 - the bridge comprising first and second polymer chains hybridized to one another,
 - the first polymer chain having a first length,
 - the second polymer chain having a second length shorter than the first length,
 - such that a gap region of the first polymer chain is not hybridized to the second polymer chain, and
 - the gap region comprising first and second universal monomers;
 - first and second polynucleotides;
 - a plurality of nucleotides, each nucleotide coupled to a corresponding label;
 - a polymerase to add nucleotides from the plurality of nucleotides to the first polynucleotide using at least a sequence of the second polynucleotide,
 - the labels corresponding to those nucleotides respectively hybridizing to the first and second universal monomers; and
 - detection circuitry to detect a sequence in which the polymerase adds the nucleotides to the first polynucleotide using at least changes in an electrical signal through the bridge, the changes being responsive to the respective hybridizations between the first and second universal monomers and the labels corresponding to those nucleotides.
2. The composition of claim 1, wherein the first and second polymer chains respectively comprise third and fourth polynucleotides.
3. The composition of claim 1 or claim 2, wherein the labels comprise respective oligonucleotides having different sequences than one another.
4. The composition of any one of claims 1 to 3, wherein the first and second universal monomers respectively comprise first and second universal bases.
5. The composition of claim 4, wherein hybridization between the oligonucleotides and the first and second universal bases changes the electrical signal through the bridge.

6. The composition of claim 4 or claim 5, wherein the first and second universal bases independently are selected from the group consisting of inosine, nitroindole, nitropyrrole, benzimidazole, 5-fluoroindole, indole nucleoside derivatives, and isocarbostyryl nucleoside derivatives.
7. The composition of any one of claims 1 to 6, wherein the gap region further comprises a stabilization region, the labels further hybridizing to the stabilization region, the stabilization region stabilizing hybridizing of the labels to the first and second universal monomers.
8. The composition of claim 3, wherein the third and fourth polynucleotides and the oligonucleotides of the labels comprise non-naturally occurring DNA.
9. The composition of claim 8, wherein the non-naturally occurring DNA comprises enantiomeric DNA.
10. The composition of any of claims 1 to 9, wherein the gap region is located at a terminal end of the first polymer chain.
11. A method for sequencing, the method comprising:
 - adding, by a polymerase, nucleotides to a first polynucleotide using at least a sequence of a second polynucleotide;
 - hybridizing labels respectively coupled to the nucleotides to a gap region of a polymer chain of a bridge spanning a space between first and second electrodes, the gap region comprising first and second universal monomers; and
 - detecting a sequence in which the polymerase adds the nucleotides to the first polynucleotide using at least changes in an electrical signal through the bridge that are responsive to respective hybridizations between the universal monomers and the labels corresponding to those nucleotides.
12. The method of claim 11, wherein the polymer chain comprises a third polynucleotide.

13. The method of claim 11 or claim 12, wherein the labels comprise respective oligonucleotides having different sequences than one another.
14. The method of any one of claims 11 to 13, wherein the first and second universal monomers respectively comprise first and second universal bases.
15. The method of claim 14, wherein hybridization between the oligonucleotides and the first and second universal bases changes the electrical signal through the bridge.
16. The method of claim 14 or claim 15, wherein the first and second universal bases independently are selected from the group consisting of inosine, nitroindole, nitropyrrole, benzimidazole, 5-fluoroindole, indole nucleoside derivatives, and isocarbostyryl nucleoside derivatives.
17. The method of any one of claims 11 to 16, the gap region further comprising a stabilization region, the method further comprising stabilizing, by the stabilization region, hybridization of the respective labels to the first and second universal monomers.
18. The method of claim 13, wherein the third polynucleotide and the oligonucleotides of the labels comprise non-naturally occurring DNA.
19. The method of claim 18, wherein the non-naturally occurring DNA comprises enantiomeric DNA.
20. The method of any one of claims 11 to 19, wherein the gap region is located at a terminal end of the polymer chain.

21. A composition, comprising:
first and second electrodes separated from one another by a space;
a bridge spanning the space between the first and second electrodes, the bridge comprising:
first and second polymer chains each having a first region in which the first and second polymer chains are not hybridized to one another; and
a second region in which the first and second polymer chains are hybridized to one another;
first and second polynucleotides;
a plurality of nucleotides, each nucleotide coupled to a corresponding label;
a polymerase coupled to the first region of the second polymer chain, the polymerase to add nucleotides of the plurality of nucleotides to the first polynucleotide using at least a sequence of the second polynucleotide,
the labels corresponding to those nucleotides respectively hybridizing to the first region of the first polymer chain; and
detection circuitry to detect a sequence in which the polymerase adds the nucleotides to the first polynucleotide using at least changes in an electrical signal through the bridge, the changes being responsive to the respective hybridizations between the first region of the first polymer chain and the labels corresponding to those nucleotides.
22. The composition of claim 21, wherein the first and second polymer chains respectively comprise third and fourth polynucleotides.
23. The composition of claim 21 or claim 22, wherein the labels comprise respective oligonucleotides having different sequences than one another.
24. The composition of any one of claims 21 to 23, wherein the polynucleotide of the first polymer chain further comprises first and second universal bases to which the oligonucleotides respectively hybridize.
25. The composition of claim 24, wherein hybridization between the oligonucleotides and the first and second universal bases changes the electrical signal through the bridge.

26. The composition of claim 25, wherein the first and second universal bases independently are selected from the group consisting of inosine, nitroindole, nitropyrrole, benzimidazole, 5-fluoroindole, indole nucleoside derivatives, and isocarbostyrl nucleoside derivatives.
27. The composition of any one of claims 23 to 26, wherein the first region of the second polymer chain comprises a polymer that does not hybridize to the oligonucleotides.
28. The composition of any one of claims 23 to 27, wherein the third and fourth polynucleotides and the oligonucleotides of the labels comprise non-naturally occurring DNA.
29. The composition of claim 28, wherein the non-naturally occurring DNA comprises enantiomeric DNA.
30. The composition of any one of claims 21 to 29, wherein the first polymer chain further comprises first and second universal monomers to which first and second monomers of each label respectively hybridize.
31. The composition of claim 30, wherein the first and second universal monomers are located at a terminal end of the first polymer chain.
32. The composition of any one of claims 21 to 31, wherein the first region of the second polymer chain is nonconductive.
33. A method for sequencing, the method comprising:
adding, by a polymerase, nucleotides to a first polynucleotide using at least a sequence of a second polynucleotide;
hybridizing labels respectively coupled to the nucleotides to a first region of a first polymer chain of a bridge spanning a space between first and second electrodes,
the bridge further comprising a second polymer chain, wherein the polymerase is coupled to the first region of the second polymer chain, and wherein a second region of the first polymer chain is hybridized to a second region of the second polymer chain; and

detecting a sequence in which the polymerase adds the nucleotides to the first polynucleotide using at least changes in an electrical signal through the bridge that are responsive to respective hybridizations between the first region of the first polymer chain and the labels corresponding to those nucleotides.

34. The method of claim 33, wherein the first and second polymer chains respectively comprise third and fourth polynucleotides.

35. The method of claim 33 or claim 34, wherein the labels comprise respective oligonucleotides having different sequences than one another.

36. The method of any one of claims 33 to 35, wherein the third polynucleotide further comprises first and second universal bases to which the oligonucleotides respectively hybridize.

37. The method of claim 36, wherein hybridization between the oligonucleotides and the first and second universal bases changes the electrical signal through the bridge.

38. The method of claim 36 or claim 37, wherein the first and second universal bases independently are selected from the group consisting of inosine, nitroindole, nitropyrrole, benzimidazole, 5-fluoroindole, indole nucleoside derivatives, and isocarbostyryl nucleoside derivatives.

39. The method of any one of claims 35 to 38, wherein the first region of the second polymer chain comprises a polymer that does not hybridize to the oligonucleotides.

40. The method of any one of claims 35 to 39, wherein the third and fourth polynucleotides and the oligonucleotides of the labels comprise non-naturally occurring DNA.

41. The method of claim 40, wherein the non-naturally occurring DNA comprises enantiomeric DNA.

42. The method of any one of claims 33 to 41, wherein the first polymer chain further comprises first and second universal monomers to which first and second monomers of each label respectively hybridize.

43. The method of claim 42, wherein the first and second universal monomers are located at a terminal end of the first polymer chain.

44. The method of any one of claims 33 to 43, wherein the first region of the second polymer chain is nonconductive.