Diverse and robust molecular algorithms using reprogrammable DNA self-assembly

– Supplementary Information B: DNA sequences –

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S9 DNA sequences for complete 6-bit 1-layer IBC tile set

Figure S9.1: Naming conventions for tile strands. Two example proofreading blocks are shown, each with their corresponding four DNA strand sequences laid out graphically below. Brown represents bit 0 and yellow represents bit 1. Red-underlined `T` bases have a `/iBiodT/` (biotin) modification. Blocks and tiles are named as follows. First, note that Figure S10 of Supplementary Information A shows proofreading blocks being positioned along rows named U1 to U8, and how those row names correspond to wire numbers of a 6-bit IBC (Figure 1a in the main text shows two wires there named w1 and w2). Using this convention each proofreading block is named by (a) the unique row it appears in, e.g. `U4`), and (b) the function it computes (e.g. `01->10`), so an example proofreading block name is `U4;01->10`. Tiles within a block are then identified by their proofreading block and a pair of letters: `sw`, `se`, `ne`, or `nw`. The "`_`" symbol indicates a tile domain that does not encode a bit as it is in, or binds to, the seam block.

There are 356 DNA tile sequences listed below, but only 355 distinct sequences as the two seam strands with names `U1;__->__;nw` and `U1;__->__;se` have identical sequences. `/iBiodT/` is IDT notation for a T base with a biotin modification that is internal to a DNA strand. Figure S9.1 describes the tile naming convention and shows example valid biotin locations.

Name	DNA sequence
U1;__->__;ne	ATTTGTCGTTT AGATTGGCTT TGCTAGTTGT TATAAGGCAGA
U1;__->__;nw	TGCACCTATT TTACTACACGA AAACGACAAAT AAGCCAATCT
U1;__->__;se	TGCACCTATT TTACTACACGA AAACGACAAAT AAGCCAATCT
U1;__->__;sw	ATGATGGATCT TGTTTGGTCT AATAGGTGCA TCGTGTAGTAA
U2;_0->_0;ne	TTGCGATAATT TGGATAAGCA AGAGTCGAAA AACGGAAAATT
U2;_0->_0;nw	TACCCTCCTA TCTGCCTTATA AAGACCTACTT TGCTTATCCA
U2;_0->_0;se	ACAACTAGCA TTCATACCGTA AATTATCGCAA TCACTTTCCA
U2;_0->_0;sw	ATTTGTCGTTT AGATTGGCTT TAGGAGGGTA TACGGTATGAA
U2;_0->_1;ne	TAGAG/iBiodT/GAGCT AAGGAATGGT AGAGTCGAAA AATTTGACGAA
U2;_0->_1;nw	ACTTCGATCA TCTGCCTTATA AAGACCTACTT ACCATTCCTT
U2;_0->_1;se	ACAACTAGCA TTAAACTGCAA AGCTCACTCTA ACATCGAACT
U2;_0->_1;sw	ATTTGTCGTTT AGATTGGCTT TGATCGAAGT TTGCAGTTTAA
U2;_1->_0;ne	TAATAGACGGA AGGTTTGACT AAGAACGAGT AACGGAAAATT
U2;_1->_0;nw	TGCACTTACT TCTGCCTTATA AAAAACACACT AGTCAAACCT
U2;_1->_0;se	ACAACTAGCA TCCTCGAAATA TCCGTCTATTA TCACTTTCCA
U2;_1->_0;sw	ATTTGTCGTTT AGATTGGCTT AGTAAGTGCA TATTTCGAGGA
U2;_1->_1;ne	TGGTC/iBiodT/GGTAT TGTTGTGACT AAGAACGAGT AATTTGACGAA
U2;_1->_1;nw	ATCTGCATCT TCTGCCTTATA AAAAACACACT AGTCACAACA
U2;_1->_1;se	ACAACTAGCA TGCCTATATCT ATACCAGACCA ACATCGAACT
U2;_1->_1;sw	ATTTGTCGTTT AGATTGGCTT AGATGCAGAT AGATATAGGCA
U3;00->00;ne	TCAAGGTAGAT TCGTGTGTAA ATTTTTGCGT AGAGGTCATAA
U3;00->00;nw	ACGACACTAA AATTTTCCGTT ATACATCACCT TTACACACGA
U3;00->00;se	TTTCGACTCT TTAGACTTCCT ATCTACCTTGA AAAAACGCAA
U3;00->00;sw	AAGTAGGTCTT TGGAAAGTGA TTAGTGTCGT AGGAAGTCTAA
U3;00->01;ne	TTTTCGATTGT TGAG/iBiodT/GGCAT ATTTTTGCGT ACGTATGGATA
U3;00->01;nw	AACCCATGAT AATTTTCCGTT ATACATCACCT ATGCCACTCA
U3;00->01;se	TTTCGACTCT TTTCACACATT ACAATCGAAAA ATCAGCATCT
U3;00->01;sw	AAGTAGGTCTT TGGAAAGTGA ATCATGGGTT AATGTGTGAAA
U3;00->10;ne	AATAATGCGTT AGGTGTTTGA ATTTTTGCGT AGAGGTCATAA
U3;00->10;nw	TACCTGCAAT AATTTTCCGTT ATACATCACCT TCAAACACCT
U3;00->10;se	ACTCGTTCTT TCTGA/iBiodT/CCCAT AACGCATTATT AAAAACGCAA
U3;00->10;sw	AGTGTGTTTTT TGGAAAGTGA ATTGCAGGTA ATGGGATCAGA
U3;00->11;ne	AGAGAGGATTT TGGA/iBiodT/CGGTT ATTTTTGCGT ACGTATGGATA
U3;00->11;nw	TCGCATACAT AATTTTCCGTT ATACATCACCT AACCGATCCA
U3;00->11;se	ACTCGTTCTT TACCT/iBiodT/CAGCT AAATCCTCTCT ATCAGCATCT

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U3;00->11;sw    AGTGTGTTTTT TGGAAAGTGA ATGTATGCGA AGCTGAAGGTA
U3;01->00;ne    AACGAAAGAAA TGTAGCAAGT AAAGAGCAGT AGAGGTCATAA
U3;01->00;nw    ACACGTTACT AATTTTCCGTT ATAGAACTCCA ACTTGCTACA
U3;01->00;se    TTTCGACTCT TTGCTCTCTAT TTTCTTTCGTT AAAAACGCAA
U3;01->00;sw    AAGTAGGTCTT TGGAAAGTGA AGTAACGTGT ATAGAGAGCAA
U3;01->01;ne    TACTGTGAGAA TGGC/iBiodT/GAGTT AAAGAGCAGT ACGTATGGATA
U3;01->01;nw    AACCTCGATT AATTTTCCGTT ATAGAACTCCA AACTCAGCCA
U3;01->01;se    TTTCGACTCT ATCACAAACAA TTCTCACAGTA ATCAGCATCT
U3;01->01;sw    AAGTAGGTCTT TGGAAAGTGA AATCGAGGTT TTGTTTGTGAT
U3;01->10;ne    AAGCTTTTTGT ATTCGGAGTT AAAGAGCAGT AGAGGTCATAA
U3;01->10;nw    TGTCACATCA AATTTTCCGTT ATAGAACTCCA AACTCCGAAT
U3;01->10;se    ACTCGTTCTT TCTCC/iBiodT/GACAT ACAAAAAGCTT AAAAACGCAA
U3;01->10;sw    AGTGTGTTTTT TGGAAAGTGA TGATGTGACA ATGTCAGGAGA
U3;01->11;ne    AGGATCGATAT AGGT/iBiodT/GCAGT AAAGAGCAGT ACGTATGGATA
U3;01->11;nw    TCTTTGACCA AATTTTCCGTT ATAGAACTCCA ACTGCAACCT
U3;01->11;se    ACTCGTTCTT ACTCC/iBiodT/CTCAA ATATCGATCCT ATCAGCATCT
U3;01->11;sw    AGTGTGTTTTT TGGAAAGTGA TGGTCAAAGA TTGAGAGGAGT
U3;10->00;ne    ATAGTACGGTT AAGGGATTGT ATTTTTGCGT AGAGGTCATAA
U3;10->00;nw    AGCTTTCACT TTCGTCAAATT ATACATCACCT ACAATCCCTT
U3;10->00;se    TTTCGACTCT TACACTCTTCA AACCGTACTAT AAAAACGCAA
U3;10->00;sw    AAGTAGGTCTT AGTTCGATGT AGTGAAAGCT TGAAGAGTGTA
U3;10->01;ne    AGTAGAGAACA AGGA/iBiodT/GCTGT ATTTTTGCGT ACGTATGGATA
U3;10->01;nw    ACTGCTCATT TTCGTCAAATT ATACATCACCT ACAGCATCCT
U3;10->01;se    TTTCGACTCT ATTACCACCTA TGTTCTCTACT ATCAGCATCT
U3;10->01;sw    AAGTAGGTCTT AGTTCGATGT AATGAGCAGT TAGGTGGTAAT
U3;10->10;ne    TAATTGGAGGA AGCGTTGATA ATTTTTGCGT AGAGGTCATAA
U3;10->10;nw    AAAAGCCTCT TTCGTCAAATT ATACATCACCT TATCAACGCT
U3;10->10;se    ACTCGTTCTT TTCCC/iBiodT/CTGAT TCCTCCAATTA AAAAACGCAA
U3;10->10;sw    AGTGTGTTTTT AGTTCGATGT AGAGGCTTTT ATCAGAGGGAA
U3;10->11;ne    AGAAGACTGAT TTGG/iBiodT/GGGTT ATTTTTGCGT ACGTATGGATA
U3;10->11;nw    AAGAACCACT TTCGTCAAATT ATACATCACCT AACCCACCAA
U3;10->11;se    ACTCGTTCTT TCATC/iBiodT/CCACT ATCAGTCTTCT ATCAGCATCT
U3;10->11;sw    AGTGTGTTTTT AGTTCGATGT AGTGGTTCTT AGTGGAGATGA
U3;11->00;ne    ATTAGGGATCA TGTGAACAGT AAAGAGCAGT AGAGGTCATAA
U3;11->00;nw    TCCAAACTGA TTCGTCAAATT ATAGAACTCCA ACTGTTCACA
U3;11->00;se    TTTCGACTCT TCCTAACTGAT TGATCCCTAAT AAAAACGCAA
U3;11->00;sw    AAGTAGGTCTT AGTTCGATGT TCAGTTTGGA ATCAGTTAGGA
U3;11->01;ne    AGAGACAGTTA TGCG/iBiodT/GAGAT AAAGAGCAGT ACGTATGGATA
U3;11->01;nw    ACCAAGTCAA TTCGTCAAATT ATAGAACTCCA ATCTCACGCA
U3;11->01;se    TTTCGACTCT ATCGTTTTCAA TAACTGTCTCT ATCAGCATCT
U3;11->01;sw    AAGTAGGTCTT AGTTCGATGT TTGACTTGGT TTGAAAACGAT
U3;11->10;ne    ACATTAGGAGA AGGGACAATT AAAGAGCAGT AGAGGTCATAA
U3;11->10;nw    ATGACACCTT TTCGTCAAATT ATAGAACTCCA AATTGTCCCT
U3;11->10;se    ACTCGTTCTT TCTCA/iBiodT/CCGAT TCTCCTAATGT AAAAACGCAA
U3;11->10;sw    AGTGTGTTTTT AGTTCGATGT AAGGTGTCAT ATCGGATGAGA
U3;11->11;ne    AAATGGTTTGA ACGA/iBiodT/GTGGT AAAGAGCAGT ACGTATGGATA
U3;11->11;nw    AACGTCATCT TTCGTCAAATT ATAGAACTCCA ACCACATCGT
U3;11->11;se    ACTCGTTCTT TGCAA/iBiodT/CAACA TCAAACCATTT ATCAGCATCT
U3;11->11;sw    AGTGTGTTTTT AGTTCGATGT AGATGACGTT TGTTGATTGCA
U4;00->00;ne    TACGAAGAGAA TGGTTAAGCA TGAAAGGACA ATTGAGGAGTA
U4;00->00;nw    ATCCGAATCA TTATGACCTCT AAACCAATGAA TGCTTAACCA
U4;00->00;se    ACGCAAAAAT AGTCCTTCATA TTCTCTTCGTA AAACTAGCCA
U4;00->00;sw    AGGTGATGTAT TTGCGTTTTT TGATTCGGAT TATGAAGGACT
U4;00->01;ne    ACGGA/iBiodT/TAGGA TGGTGTTACA TGAAAGGACA TACAAGAAGGA
U4;00->01;nw    ATCGAAACCT TTATGACCTCT AAACCAATGAA TGTAACACCA
U4;00->01;se    ACGCAAAAAT ATCTACCTGTT TCCTAATCCGT TGAATCCCAA
U4;00->01;sw    AGGTGATGTAT TTGCGTTTTT AGGTTTCGAT AACAGGTAGAT
U4;00->10;ne    ATTTTATGCGT TTCGAGTGAA TGAAAGGACA ATTGAGGAGTA
U4;00->10;nw    AGCAC/iBiodT/CCAA TTATGACCTCT AAACCAATGAA TTCACTCGAA
U4;00->10;se    ACTGCTCTTT TCAAAGCAATT ACGCATAAAAT AAACTAGCCA
U4;00->10;sw    TGGAGTTCTAT TTGCGTTTTT TTGGAGTGCT AATTGCTTTGA
U4;00->11;ne    AAGAG/iBiodT/GGGAT TGATTAGGCA TGAAAGGACA TACAAGAAGGA
U4;00->11;nw    ACTCA/iBiodT/GCCA TTATGACCTCT AAACCAATGAA TGCCTAATCA
U4;00->11;se    ACTGCTCTTT TCCTTTCTAGT ATCCCACTCTT TGAATCCCAA
U4;00->11;sw    TGGAGTTCTAT TTGCGTTTTT TGGCATGAGT ACTAGAAAGGA
U4;01->00;ne    TCTGGAAGTAT ATGTCGATGA AAGATAGCGT ATTGAGGAGTA
U4;01->00;nw    TGTCACCTTT TTATGACCTCT TTATCCAGTCT TCATCGACAT
U4;01->00;se    ACGCAAAAAT ATACCTCCATT ATACTTCCAGA AAACTAGCCA
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U4;01->00;sw    AGGTGATGTAT TTGCGTTTTT AAAGGTGACA AATGGAGGTAT
U4;01->01;ne    ATGGA/iBiodT/GAGGT TGTTAGCGTA AAGATAGCGT TACAAGAAGGA
U4;01->01;nw    ACACTGTCAA TTATGACCTCT TTATCCAGTCT TACGCTAACA
U4;01->01;se    ACGCAAAAAT TGTTCACATTT ACCTCATCCAT TGAATCCCAA
U4;01->01;sw    AGGTGATGTAT TTGCGTTTTT TTGACAGTGT AAATGTGAACA
U4;01->10;ne    AAAATTGACGT ATGCAAGAGA AAGATAGCGT ATTGAGGAGTA
U4;01->10;nw    ACTGC/iBiodT/CACA TTATGACCTCT TTATCCAGTCT TCTCTTGCAT
U4;01->10;se    ACTGCTCTTT TACACCCATAT ACGTCAATTTT AAACTAGCCA
U4;01->10;sw    TGGAGTTCTAT TTGCGTTTTT TGTGAGCAGT ATATGGGTGTA
U4;01->11;ne    TTGCA/iBiodT/TTGGA AGCTGGATTT AAGATAGCGT TACAAGAAGGA
U4;01->11;nw    AACGA/iBiodT/CCCA TTATGACCTCT TTATCCAGTCT AAATCCAGCT
U4;01->11;se    ACTGCTCTTT AAAATGCTCAA TCCAAATGCAA TGAATCCCAA
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U4;10->00;se    ACGCAAAAAT ATCTGACCTTA TTACTCTGCTA AAACTAGCCA
U4;10->00;sw    AGGTGATGTAT AGATGCTGAT ATGTGTCTGT TAAGGTCAGAT
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U4;10->10;se    ACTGCTCTTT TCTCGATAACT TTTTACACGTT AAACTAGCCA
U4;10->10;sw    TGGAGTTCTAT AGATGCTGAT TTGCAGAGGT AGTTATCGAGA
U4;10->11;ne    TAGGA/iBiodT/TCGGT TTTGAGACGA TGAAAGGACA TACAAGAAGGA
U4;10->11;nw    TCATC/iBiodT/CGCA TATCCATACGT AAACCAATGAA TCGTCTCAAA
U4;10->11;se    ACTGCTCTTT AAGCTTCAATT ACCGAATCCTA TGAATCCCAA
U4;10->11;sw    TGGAGTTCTAT AGATGCTGAT TGCGAGATGA AATTGAAGCTT
U4;11->00;ne    TCTGGTGATAA ATCGTTGAGA AAGATAGCGT ATTGAGGAGTA
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U4;11->00;se    ACGCAAAAAT TCTTTCCTCTT TTATCACCAGA AAACTAGCCA
U4;11->00;sw    AGGTGATGTAT AGATGCTGAT AAGGTCAAGT AAGAGGAAAGA
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U4;11->01;nw    TCCACAACTT TATCCATACGT TTATCCAGTCT ATTGTCCACT
U4;11->01;se    ACGCAAAAAT ACCAACTACTA TACCCATGCTA TGAATCCCAA
U4;11->01;sw    AGGTGATGTAT AGATGCTGAT AAGTTGTGGA TAGTAGTTGGT
U4;11->10;ne    ATCGAGGAATA TGTGAAGTGA AAGATAGCGT ATTGAGGAGTA
U4;11->10;nw    AACCC/iBiodT/TCGA TATCCATACGT TTATCCAGTCT TCACTTCACA
U4;11->10;se    ACTGCTCTTT TATCTCCTTGT TATTCCTCGAT AAACTAGCCA
U4;11->10;sw    TGGAGTTCTAT AGATGCTGAT TCGAAGGGTT ACAAGGAGATA
U4;11->11;ne    TTCTG/iBiodT/AGGGT TGTTTGGGAT AAGATAGCGT TACAAGAAGGA
U4;11->11;nw    TTCCG/iBiodT/CCAT TATCCATACGT TTATCCAGTCT ATCCCAAACA
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U4;11->11;sw    TGGAGTTCTAT AGATGCTGAT ATGGACGGAA ATGACATAGGA
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U5;00->00;nw    AGCAACTCTT TACTCCTCAAT TCATTACCTCT ACTTGTCCTT
U5;00->00;se    TGTCCTTTCA AATTTCAGCAT TACCGATTACA ATTCGCACTA
U5;00->00;sw    TTCATTGGTTT TGGCTAGTTT AAGAGTTGCT ATGCTGAAATT
U5;00->01;ne    AGTAGGCATAA ACGG/iBiodT/GTGAT AAAATTGCGT AATGTTGGAAA
U5;00->01;nw    TCGACTTCAT TACTCCTCAAT TCATTACCTCT ATCACACCGT
U5;00->01;se    TGTCCTTTCA ACTAACCATCT TTATGCCTACT ACCGATTCTT
U5;00->01;sw    TTCATTGGTTT TGGCTAGTTT ATGAAGTCGA AGATGGTTAGT
U5;00->10;ne    TGTAGAGTCAT AAGAGGTTGT AAAATTGCGT ACTTAAGGGAA
U5;00->10;nw    ACCTAAACGT TACTCCTCAAT TCATTACCTCT ACAACCTCTT
U5;00->10;se    ACGCTATCTT AAGCC/iBiodT/CCTAT ATGACTCTACA ATTCGCACTA
U5;00->10;sw    AGACTGGATAA TGGCTAGTTT ACGTTTAGGT ATAGGAGGCTT
U5;00->11;ne    AATTAGGGAGA AGGT/iBiodT/TGGCT AAAATTGCGT AATGTTGGAAA
U5;00->11;nw    ATCCGTTTCT TACTCCTCAAT TCATTACCTCT AGCCAAACCT
U5;00->11;se    ACGCTATCTT ACCTT/iBiodT/GCTTT TCTCCCTAATT ACCGATTCTT
U5;00->11;sw    AGACTGGATAA TGGCTAGTTT AGAAACGGAT AAAGCAAAGGT
U5;01->00;ne    TGAGATTGAGA TTGGGAAGTT AATTCTGGGT ACTTAAGGGAA
U5;01->00;nw    ACGATTCTCA TACTCCTCAAT ATTTCCACAAA AACTTCCCAA
U5;01->00;se    TGTCCTTTCA ACTTGTATCCT TCTCAATCTCA ATTCGCACTA
U5;01->00;sw    TTCATTGGTTT TGGCTAGTTT TGAGAATCGT AGGATACAAGT
U5;01->01;ne    AAGGTCTATGT TGGG/iBiodT/GTCAA AATTCTGGGT AATGTTGGAAA
U5;01->01;nw    TCATGTCCAA TACTCCTCAAT ATTTCCACAAA TTGACACCCA
U5;01->01;se    TGTCCTTTCA TATTCCAGACT ACATAGACCTT ACCGATTCTT
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U5;01->01;sw    TTCATTGGTTT TGGCTAGTTT TTGGACATGA AGTCTGGAATA
U5;01->10;ne    TGAATAGGACT TGGTATGCAT AATTCTGGGT ACTTAAGGGAA
U5;01->10;nw    ACAACATCCT TACTCCTCAAT ATTTCCACAAA ATGCATACCA
U5;01->10;se    ACGCTATCTT ACCAC/iBiodT/CTTCT AGTCCTATTCA ATTCGCACTA
U5;01->10;sw    AGACTGGATAA TGGCTAGTTT AGGATGTTGT AGAAGAGTGGT
U5;01->11;ne    AAGGAGTCTAA TGGT/iBiodT/CGAGT AATTCTGGGT AATGTTGGAAA
U5;01->11;nw    ACAGCACTAA TACTCCTCAAT ATTTCCACAAA ACTCGAACCA
U5;01->11;se    ACGCTATCTT ACCCT/iBiodT/ATCGA TTAGACTCCTT ACCGATTCTT
U5;01->11;sw    AGACTGGATAA TGGCTAGTTT TTAGTGCTGT TCGATAAGGGT
U5;10->00;ne    ATAGATCGTGA AGGGTTTCTT AAAATTGCGT ACTTAAGGGAA
U5;10->00;nw    AACACAGTCT TCCTTCTTGTA TCATTACCTCT AAGAAACCCT
U5;10->00;se    TGTCCTTTCA TCATAGCCATA TCACGATCTAT ATTCGCACTA
U5;10->00;sw    TTCATTGGTTT TTGGGATTCA AGACTGTGTT TATGGCTATGA
U5;10->01;ne    AATGCATTGAA AGTG/iBiodT/CGTGT AAAATTGCGT AATGTTGGAAA
U5;10->01;nw    TCAGCTCAAT TCCTTCTTGTA TCATTACCTCT ACACGACACT
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U5;10->01;sw    TTCATTGGTTT TTGGGATTCA ATTGAGCTGA TTTCGGATAGA
U5;10->10;ne    TGAGAGATCTT AGAACTGGTT AAAATTGCGT ACTTAAGGGAA
U5;10->10;nw    TCATCGCATA TCCTTCTTGTA TCATTACCTCT AACCAGTTCT
U5;10->10;se    ACGCTATCTT ACCTG/iBiodT/CTACA AAGATCTCTCA ATTCGCACTA
U5;10->10;sw    AGACTGGATAA TTGGGATTCA TATGCGATGA TGTAGACAGGT
U5;10->11;ne    AGTTTCTAGGA TGCA/iBiodT/GGAGT AAAATTGCGT AATGTTGGAAA
U5;10->11;nw    AACTGCTACA TCCTTCTTGTA TCATTACCTCT ACTCCATGCA
U5;10->11;se    ACGCTATCTT ACATT/iBiodT/GCCTT TCCTAGAAACT ACCGATTCTT
U5;10->11;sw    AGACTGGATAA TTGGGATTCA TGTAGCAGTT AAGGCAAATGT
U5;11->00;ne    TTGTTTCATGT AAGGTGCTTA AATTCTGGGT ACTTAAGGGAA
U5;11->00;nw    AACCACGTTA TCCTTCTTGTA ATTTCCACAAA TAAGCACCTT
U5;11->00;se    TGTCCTTTCA ATACTACGACA ACATGAAACAA ATTCGCACTA
U5;11->00;sw    TTCATTGGTTT TTGGGATTCA TAACGTGGTT TGTCGTAGTAT
U5;11->01;ne    AGGAGGATAAA ACGG/iBiodT/TGAGT AATTCTGGGT AATGTTGGAAA
U5;11->01;nw    TAAACCGACA TCCTTCTTGTA ATTTCCACAAA ACTCAACCGT
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U5;11->01;sw    TTCATTGGTTT TTGGGATTCA TGTCGGTTTA TGCATAGTAGA
U5;11->10;ne    ATTGGTCAAAA ACGATGGAAT AATTCTGGGT ACTTAAGGGAA
U5;11->10;nw    AACGCTCTTA TCCTTCTTGTA ATTTCCACAAA ATTCCATCGT
U5;11->10;se    ACGCTATCTT TCCAG/iBiodT/CATCA TTTTGACCAAT ATTCGCACTA
U5;11->10;sw    AGACTGGATAA TTGGGATTCA TAAGAGCGTT TGATGACTGGA
U5;11->11;ne    AGTCTGAAGTA AGCT/iBiodT/GTGGT AATTCTGGGT AATGTTGGAAA
U5;11->11;nw    TTATGCCTCA TCCTTCTTGTA ATTTCCACAAA ACCACAAGCT
U5;11->11;se    ACGCTATCTT ACTCC/iBiodT/CAGAA TACTTCAGACT ACCGATTCTT
U5;11->11;sw    AGACTGGATAA TTGGGATTCA TGAGGCATAA TTCTGAGGAGT
U6;00->00;ne    AAAGCGTAATT TGTTGGACTT ATAGAAGCGT AGGACAGTTAT
U6;00->00;nw    TCCACAAGTT TTCCCTTAAGT AGACTATCACA AAGTCCAACA
U6;00->00;se    ACGCAATTTT TCCATACAGAT AATTACGCTTT AATCGACTCA
U6;00->00;sw    AGAGGTAATGA TAGTGCGAAT AACTTGTGGA ATCTGTATGGA
U6;00->01;ne    AGAGC/iBiodT/GAGAA AAGAAGGCAT ATAGAAGCGT TGCATATAGGA
U6;00->01;nw    AACTCACTGT TTCCCTTAAGT AGACTATCACA ATGCCTTCTT
U6;00->01;se    ACGCAATTTT TCCTCAACTAA TTCTCAGCTCT AATACCAGCA
U6;00->01;sw    AGAGGTAATGA TAGTGCGAAT ACAGTGAGTT TTAGTTGAGGA
U6;00->10;ne    AGAAGATACGT TGCGAGTATT ATAGAAGCGT AGGACAGTTAT
U6;00->10;nw    ACAGC/iBiodT/CCAT TTCCCTTAAGT AGACTATCACA AATACTCGCA
U6;00->10;se    ACCCAGAATT TTCCTTAGACT ACGTATCTTCT AATCGACTCA
U6;00->10;sw    TTTGTGGAAAT TAGTGCGAAT ATGGAGCTGT AGTCTAAGGAA
U6;00->11;ne    AGATC/iBiodT/TGGGA AGTGTGTCTT ATAGAAGCGT TGCATATAGGA
U6;00->11;nw    ACTCT/iBiodT/GCCT TTCCCTTAAGT AGACTATCACA AAGACACACT
U6;00->11;se    ACCCAGAATT TCACTTAGCTA TCCCAAGATCT AATACCAGCA
U6;00->11;sw    TTTGTGGAAAT TAGTGCGAAT AGGCAAGAGT TAGCTAAGTGA
U6;01->00;ne    TCAGGATGTTA TCGAAGTTGA TCAGGGAAAA AGGACAGTTAT
U6;01->00;nw    ACCCAAAGAT TTCCCTTAAGT ATCTCCTACAA TCAACTTCGA
U6;01->00;se    ACGCAATTTT TCTCTAACCAA TAACATCCTGA AATCGACTCA
U6;01->00;sw    AGAGGTAATGA TAGTGCGAAT ATCTTTGGGT TTGGTTAGAGA
U6;01->01;ne    TCTGG/iBiodT/GAGAT AGAGTTCGTT TCAGGGAAAA TGCATATAGGA
U6;01->01;nw    TCATAACCGT TTCCCTTAAGT ATCTCCTACAA AACGAACTCT
U6;01->01;se    ACGCAATTTT TCCTTCCTATT ATCTCACCAGA AATACCAGCA
U6;01->01;sw    AGAGGTAATGA TAGTGCGAAT ACGGTTATGA AATAGGAAGGA
U6;01->10;ne    AGCTATGTAGT TATGCTGTGT TCAGGGAAAA AGGACAGTTAT
U6;01->10;nw    AAGCA/iBiodT/CCCT TTCCCTTAAGT ATCTCCTACAA ACACAGCATA
U6;01->10;se    ACCCAGAATT TGATCCCTATT ACTACATAGCT AATCGACTCA
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U6;01->10;sw    TTTGTGGAAAT TAGTGCGAAT AGGGATGCTT AATAGGGATCA
U6;01->11;ne    AGAGA/iBiodT/TCGGA AGTGACATGT TCAGGGAAAA TGCATATAGGA
U6;01->11;nw    ACTTC/iBiodT/CGCT TTCCCTTAAGT ATCTCCTACAA ACATGTCACT
U6;01->11;se    ACCCAGAATT ATTAAACGCTT TCCGAATCTCT AATACCAGCA
U6;01->11;sw    TTTGTGGAAAT TAGTGCGAAT AGCGAGAAGT AAGCGTTTAAT
U6;10->00;ne    AGTACTGAAGA TGTGGTTTCT ATAGAAGCGT AGGACAGTTAT
U6;10->00;nw    ACTACATGCA TTTCCAACATT AGACTATCACA AGAAACCACA
U6;10->00;se    ACGCAATTTT TCTCTCATTGA TCTTCAGTACT AATCGACTCA
U6;10->00;sw    AGAGGTAATGA AAGAATCGGT TGCATGTAGT TCAATGAGAGA
U6;10->01;ne    AGGCA/iBiodT/AGAGT TGGATTGTCA ATAGAAGCGT TGCATATAGGA
U6;10->01;nw    AGCAATACCA TTTCCAACATT AGACTATCACA TGACAATCCA
U6;10->01;se    ACGCAATTTT TCCAATAGTCT ACTCTATGCCT AATACCAGCA
U6;10->01;sw    AGAGGTAATGA AAGAATCGGT TGGTATTGCT AGACTATTGGA
U6;10->10;ne    TAACAGGGTAA TGGGAAACTT ATAGAAGCGT AGGACAGTTAT
U6;10->10;nw    ACACA/iBiodT/CCGA TTTCCAACATT AGACTATCACA AAGTTTCCCA
U6;10->10;se    ACCCAGAATT TCCTCTGTTTA TTACCCTGTTA AATCGACTCA
U6;10->10;sw    TTTGTGGAAAT AAGAATCGGT TCGGATGTGT TAAACAGAGGA
U6;10->11;ne    AGAGG/iBiodT/GTTCT TGAGTTGACA ATAGAAGCGT TGCATATAGGA
U6;10->11;nw    ACTCT/iBiodT/CGCA TTTCCAACATT AGACTATCACA TGTCAACTCA
U6;10->11;se    ACCCAGAATT TTATACGTCCT AGAACACCTCT AATACCAGCA
U6;10->11;sw    TTTGTGGAAAT AAGAATCGGT TGCGAAGAGT AGGACGTATAA
U6;11->00;ne    AGTCTGTGTAT AGCGATGTAT TCAGGGAAAA AGGACAGTTAT
U6;11->00;nw    TGCACACTAT TTTCCAACATT ATCTCCTACAA ATACATCGCT
U6;11->00;se    ACGCAATTTT ATTCTCCAGAT ATACACAGACT AATCGACTCA
U6;11->00;sw    AGAGGTAATGA AAGAATCGGT ATAGTGTGCA ATCTGGAGAAT
U6;11->01;ne    TTGCA/iBiodT/GGTTT AAATGGGTCT TCAGGGAAAA TGCATATAGGA
U6;11->01;nw    ATAACTGCCA TTTCCAACATT ATCTCCTACAA AGACCCATTT
U6;11->01;se    ACGCAATTTT ATGCTCTCTAA AAACCATGCAA AATACCAGCA
U6;11->01;sw    AGAGGTAATGA AAGAATCGGT TGGCAGTTAT TTAGAGAGCAT
U6;11->10;ne    TATGGGTACAT AGGTTGTTCA TCAGGGAAAA AGGACAGTTAT
U6;11->10;nw    ACACG/iBiodT/ACCA TTTCCAACATT ATCTCCTACAA TGAACAACCT
U6;11->10;se    ACCCAGAATT TACATCATCCA ATGTACCCATA AATCGACTCA
U6;11->10;sw    TTTGTGGAAAT AAGAATCGGT TGGTACGTGT TGGATGATGTA
U6;11->11;ne    AGCGA/iBiodT/GAAAA ACGTGTAAGT TCAGGGAAAA TGCATATAGGA
U6;11->11;nw    ACCCA/iBiodT/TCGA TTTCCAACATT ATCTCCTACAA ACTTACACGT
U6;11->11;se    ACCCAGAATT AGCCTATAACT TTTTCATCGCT AATACCAGCA
U6;11->11;sw    TTTGTGGAAAT AAGAATCGGT TCGAATGGGT AGTTATAGGCT
U7;00->00;ne    TTGTTGCTTTA TGTGTTCTGA AATCGTGGAT AGGAAGTAAGA
U7;00->00;nw    ACACGTACTT ATAACTGTCCT AAATTGAACCA TCAGAACACA
U7;00->00;se    ACGCTTCTAT AACTACTACCA TAAAGCAACAA AATCACCCTT
U7;00->00;sw    TGTGATAGTCT TGAGTCGATT AAGTACGTGT TGGTAGTAGTT
U7;00->01;ne    AGGAAAGTAGA TGAG/iBiodT/GCAGA AATCGTGGAT AAGTAGACAGA
U7;00->01;nw    ACAATGCCTA ATAACTGTCCT AAATTGAACCA TCTGCACTCA
U7;00->01;se    ACGCTTCTAT ACCGTTTTTAA TCTACTTTCCT ACGTTACCAA
U7;00->01;sw    TGTGATAGTCT TGAGTCGATT TAGGCATTGT TTAAAAACGGT
U7;00->10;ne    AGAGATGAAGA TTGTTAGGCA AATCGTGGAT AGGAAGTAAGA
U7;00->10;nw    ACCGTTACAA ATAACTGTCCT AAATTGAACCA TGCCTAACAA
U7;00->10;se    TTTTCCCTGA TTCTT/iBiodT/TCGCA TCTTCATCTCT AATCACCCTT
U7;00->10;sw    TTGTAGGAGAT TGAGTCGATT TTGTAACGGT TGCGAAAAGAA
U7;00->11;ne    ATCATGAGAGA TTGG/iBiodT/GAGCT AATCGTGGAT AAGTAGACAGA
U7;00->11;nw    AGCACTAACA ATAACTGTCCT AAATTGAACCA AGCTCACCAA
U7;00->11;se    TTTTCCCTGA TACAC/iBiodT/GACCA TCTCTCATGAT ACGTTACCAA
U7;00->11;sw    TTGTAGGAGAT TGAGTCGATT TGTTAGTGCT TGGTCAGTGTA
U7;01->00;ne    AGTATAGGCAA AGACGGAAAT TGAACGGTTA AGGAAGTAAGA
U7;01->00;nw    AAGAACCCTT ATAACTGTCCT AGTCTCATCAT ATTTCCGTCT
U7;01->00;se    ACGCTTCTAT ACTCAGATCTT TTGCCTATACT AATCACCCTT
U7;01->00;sw    TGTGATAGTCT TGAGTCGATT AAGGGTTCTT AAGATCTGAGT
U7;01->01;ne    AGTTAGTCAGT TGCG/iBiodT/AAGGA TGAACGGTTA AAGTAGACAGA
U7;01->01;nw    TCACCAAGTT ATAACTGTCCT AGTCTCATCAT TCCTTACGCA
U7;01->01;se    ACGCTTCTAT TCTAATGTCCT ACTGACTAACT ACGTTACCAA
U7;01->01;sw    TGTGATAGTCT TGAGTCGATT AACTTGGTGA AGGACATTAGA
U7;01->10;ne    TTCATAGTGGA AGTGTAGCAT TGAACGGTTA AGGAAGTAAGA
U7;01->10;nw    AAGCTACACA ATAACTGTCCT AGTCTCATCAT ATGCTACACT
U7;01->10;se    TTTTCCCTGA TCTCG/iBiodT/CCTTA TCCACTATGAA AATCACCCTT
U7;01->10;sw    TTGTAGGAGAT TGAGTCGATT TGTGTAGCTT TAAGGACGAGA
U7;01->11;ne    ATACGGATAGT TGCT/iBiodT/GAGGT TGAACGGTTA AAGTAGACAGA
U7;01->11;nw    TCTGCATCAT ATAACTGTCCT AGTCTCATCAT ACCTCAAGCA
U7;01->11;se    TTTTCCCTGA TCGCT/iBiodT/TCATT ACTATCCGTAT ACGTTACCAA
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U7;01->11;sw    TTGTAGGAGAT TGAGTCGATT ATGATGCAGA AATGAAAGCGA
U7;10->00;ne    ATGGACTAGAA AGCAGTTGTA AATCGTGGAT AGGAAGTAAGA
U7;10->00;nw    TACCGAACAT TCCTATATGCA AAATTGAACCA TACAACTGCT
U7;10->00;se    ACGCTTCTAT ACCCTTGATAT TTCTAGTCCAT AATCACCCTT
U7;10->00;sw    TGTGATAGTCT TGCTGGTATT ATGTTCGGTA ATATCAAGGGT
U7;10->01;ne    ATATGACAGGA ATGC/iBiodT/GGGAA AATCGTGGAT AAGTAGACAGA
U7;10->01;nw    ACTGTTCCTT TCCTATATGCA AAATTGAACCA TTCCCAGCAT
U7;10->01;se    ACGCTTCTAT ACTCTCTTGAT TCCTGTCATAT ACGTTACCAA
U7;10->01;sw    TGTGATAGTCT TGCTGGTATT AAGGAACAGT ATCAAGAGAGT
U7;10->10;ne    TAGGATGACTT AATGTCGGTA AATCGTGGAT AGGAAGTAAGA
U7;10->10;nw    TCAGAAACCA TCCTATATGCA AAATTGAACCA TACCGACATT
U7;10->10;se    TTTTCCCTGA ACGTC/iBiodT/CCATA AAGTCATCCTA AATCACCCTT
U7;10->10;sw    TTGTAGGAGAT TGCTGGTATT TGGTTTCTGA TATGGAGACGT
U7;10->11;ne    AGGAGGTATTT ACGT/iBiodT/GGAGA AATCGTGGAT AAGTAGACAGA
U7;10->11;nw    ACAATCTCGA TCCTATATGCA AAATTGAACCA TCTCCAACGT
U7;10->11;se    TTTTCCCTGA TTCCC/iBiodT/CAAGA AAATACCTCCT ACGTTACCAA
U7;10->11;sw    TTGTAGGAGAT TGCTGGTATT TCGAGATTGT TCTTGAGGGAA
U7;11->00;ne    TTAGGTACGAT ACGTATTGGA TGAACGGTTA AGGAAGTAAGA
U7;11->00;nw    AGACAACCTT TCCTATATGCA AGTCTCATCAT TCCAATACGT
U7;11->00;se    ACGCTTCTAT TTCACTCCTAT ATCGTACCTAA AATCACCCTT
U7;11->00;sw    TGTGATAGTCT TGCTGGTATT AAGGTTGTCT ATAGGAGTGAA
U7;11->01;ne    AGCTTGAATTT TGGG/iBiodT/GTGAT TGAACGGTTA AAGTAGACAGA
U7;11->01;nw    ATCGTCACAT TCCTATATGCA AGTCTCATCAT ATCACACCCA
U7;11->01;se    ACGCTTCTAT TTTCACAAGTT AAATTCAAGCT ACGTTACCAA
U7;11->01;sw    TGTGATAGTCT TGCTGGTATT ATGTGACGAT AACTTGTGAAA
U7;11->10;ne    ATAAGGTCTGT TTTCGAGAGT TGAACGGTTA AGGAAGTAAGA
U7;11->10;nw    AAAAGTCCCA TCCTATATGCA AGTCTCATCAT ACTCTCGAAA
U7;11->10;se    TTTTCCCTGA TAGCC/iBiodT/AACCA ACAGACCTTAT AATCACCCTT
U7;11->10;sw    TTGTAGGAGAT TGCTGGTATT TGGGACTTTT TGGTTAGGCTA
U7;11->11;ne    ATGTGGTACTA AGGA/iBiodT/GGCTT TGAACGGTTA AAGTAGACAGA
U7;11->11;nw    ACGTTCTTCA TCCTATATGCA AGTCTCATCAT AAGCCATCCT
U7;11->11;se    TTTTCCCTGA ATCAA/iBiodT/GCACA TAGTACCACAT ACGTTACCAA
U7;11->11;sw    TTGTAGGAGAT TGCTGGTATT TGAAGAACGT TGTGCATTGAT
U8;0_->0_;ne    AGGGATAACTT AGCGTAGAAT AATAGGTGCA TCGTGTAGTAA
U8;0_->0_;nw    TACACACACA TCTTACTTCCT AGATCCATCAT ATTCTACGCT
U8;0_->0_;se    ATCCACGATT ACTTAGCTACA AAGTTATCCCT AGACCAAACA
U8;0_->0_;sw    TGGTTCAATTT AAGGGTGATT TGTGTGTGTA TGTAGCTAAGT
U8;0_->1_;ne    AGCTATATGGT ACAAGGGAAT AATAGGTGCA TCGTGTAGTAA
U8;0_->1_;nw    AATCC/iBiodT/GCCA TCTTACTTCCT AGATCCATCAT ATTCCCTTGT
U8;0_->1_;se    TAACCGTTCA TACGATAACCT ACCATATAGCT AGACCAAACA
U8;0_->1_;sw    ATGATGAGACT AAGGGTGATT TGGCAGGATT AGGTTATCGTA
U8;1_->0_;ne    AGTGAGTGATA TGGGACAAAT AATAGGTGCA TCGTGTAGTAA
U8;1_->0_;nw    ATTAGCACCA TCTGTCTACTT AGATCCATCAT ATTTGTCCCA
U8;1_->0_;se    ATCCACGATT ATTCTCTCCTT TATCACTCACT AGACCAAACA
U8;1_->0_;sw    TGGTTCAATTT TTGGTAACGT TGGTGCTAAT AAGGAGAGAAT
U8;1_->1_;ne    TAGCTTAGGTT TGGTCAGTTT AATAGGTGCA TCGTGTAGTAA
U8;1_->1_;nw    ACCGA/iBiodT/CACA TCTGTCTACTT AGATCCATCAT AAACTGACCA
U8;1_->1_;se    TAACCGTTCA TTTTGCCATTA AACCTAAGCTA AGACCAAACA
U8;1_->1_;sw    ATGATGAGACT TTGGTAACGT TGTGATCGGT TAATGGCAAAA
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S10 DNA sequences for input-adapters

There are 53 input-adapter DNA sequences. In the input-adapter names, the notation `b`i, for any $i \in \{1, 2, 3, 4, 5, 6\}$, refers to the bit value on wire i. For example `adpU3;b1=0;b2=1` means that wires 1 and 2 have input values 0 and 2, respectively. For input-adapters that reach into the inside of a proofreading block p (i.e. blocks U2, U4, U6, U8, see Figure S10 in Supplementary Information A) the input bit value(s) provided by the input-adapter correspond to the values encoded by the outputs of p. For example the input-adapter name `adpU4;b2=1;b3=1;00->11` means that the input-adapter binds into a proofreading block that computes the function `00->11` and that input bit 1 is being provided on both wires 2 and 3. The "`_`" symbol indicates an input-adapter domain that does not encode a bit as it is in or on the seam block. Section S6.2 (Supplementary Information A) contains an example experiment the uses input-adapter names.

Name	DNA sequence
adpU1;__->__	CCCTTCTC TAGTCTTTAATGCGCG AAGCCAATCT TGCACCTATT TCGTCTTTCCAGACGT
adpU2;_;b1=0;_0->_0	GATGGCAATTCATCAA TGCTTATCCA TACCCTCCTA AACTGATAGCCCTAAA
adpU2;_;b1=1;_0->_1	GATGGCAATTCATCAA ACCATTCCTT ACTTCGATCA AACTGATAGCCCTAAA
adpU2;_;b1=0;_1->_0	GATGGCAATTCATCAA AGTCAAACCT TGCACTTACT AACTGATAGCCCTAAA
adpU2;_;b1=1;_1->_1	GATGGCAATTCATCAA AGTCACAACA ATCTGCATCT AACTGATAGCCCTAAA
adpU3;b1=0;b2=0	ATAGTGAATTTATCAA AAAAACGCAA TTTCGACTCT TATAATCCTGATTGTT
adpU3;b1=0;b2=1	ATAGTGAATTTATCAA ATCAGCATCT TTTCGACTCT TATAATCCTGATTGTT
adpU3;b1=1;b2=0	ATAGTGAATTTATCAA AAAAACGCAA ACTCGTTCTT TATAATCCTGATTGTT
adpU3;b1=1;b2=1	ATAGTGAATTTATCAA ATCAGCATCT ACTCGTTCTT TATAATCCTGATTGTT
adpU4;b2=0;b3=0;00->00	GCCTGTTTATCAACAA TGCTTAACCA ATCCGAATCA AATCATAGGTCTGAGA
adpU4;b2=0;b3=1;00->01	GCCTGTTTATCAACAA TGTAACACCA ATCGAAACCT AATCATAGGTCTGAGA
adpU4;b2=1;b3=0;00->10	GCCTGTTTATCAACAA TTCACTCGAA AGCACTCCAA AATCATAGGTCTGAGA
adpU4;b2=1;b3=1;00->11	GCCTGTTTATCAACAA TGCCTAATCA ACTCATGCCA AATCATAGGTCTGAGA
adpU4;b2=0;b3=0;01->00	GCCTGTTTATCAACAA TCATCGACAT TGTCACCTTT AATCATAGGTCTGAGA
adpU4;b2=0;b3=1;01->01	GCCTGTTTATCAACAA TACGCTAACA ACACTGTCAA AATCATAGGTCTGAGA
adpU4;b2=1;b3=0;01->10	GCCTGTTTATCAACAA TCTCTTGCAT ACTGCTCACA AATCATAGGTCTGAGA
adpU4;b2=1;b3=1;01->11	GCCTGTTTATCAACAA AAATCCAGCT AACGATCCCA AATCATAGGTCTGAGA
adpU4;b2=0;b3=0;10->00	GCCTGTTTATCAACAA TTCCAACTCA ACAGACACAT AATCATAGGTCTGAGA
adpU4;b2=0;b3=1;10->01	GCCTGTTTATCAACAA TATCGCAACT TTCAAGACCA AATCATAGGTCTGAGA
adpU4;b2=1;b3=0;10->10	GCCTGTTTATCAACAA AACCCTCAAT ACCTCTGCAA AATCATAGGTCTGAGA
adpU4;b2=1;b3=1;10->11	GCCTGTTTATCAACAA TCGTCTCAAA TCATCTCGCA AATCATAGGTCTGAGA
adpU4;b2=0;b3=0;11->00	GCCTGTTTATCAACAA TCTCAACGAT ACTTGACCTT AATCATAGGTCTGAGA
adpU4;b2=0;b3=1;11->01	GCCTGTTTATCAACAA ATTGTCCACT TCCACAACTT AATCATAGGTCTGAGA
adpU4;b2=1;b3=0;11->10	GCCTGTTTATCAACAA TCACTTCACA AACCCTTCGA AATCATAGGTCTGAGA
adpU4;b2=1;b3=1;11->11	GCCTGTTTATCAACAA ATCCCAAACA TTCCGTCCAT AATCATAGGTCTGAGA
adpU5;b3=0;b4=0	TTACAGAGAGAATAAC ATTCGCACTA TGTCCTTTCA TAGATAAGTCCTGAAC
adpU5;b3=0;b4=1	TTACAGAGAGAATAAC ACCGATTCTT TGTCCTTTCA TAGATAAGTCCTGAAC
adpU5;b3=1;b4=0	TTACAGAGAGAATAAC ATTCGCACTA ACGCTATCTT TAGATAAGTCCTGAAC
adpU5;b3=1;b4=1	TTACAGAGAGAATAAC ACCGATTCTT ACGCTATCTT TAGATAAGTCCTGAAC
adpU6;b4=0;b5=0;00->00	TGACGGAAATTATTCA AAGTCCAACA TCCACAAGTT ATAAAAACAGGGAAGC
adpU6;b4=0;b5=1;00->01	TGACGGAAATTATTCA ATGCCTTCTT AACTCACTGT ATAAAAACAGGGAAGC
adpU6;b4=1;b5=0;00->10	TGACGGAAATTATTCA AATACTCGCA ACAGCTCCAT ATAAAAACAGGGAAGC
adpU6;b4=1;b5=1;00->11	TGACGGAAATTATTCA AAGACACACT ACTCTTGCCT ATAAAAACAGGGAAGC
adpU6;b4=0;b5=0;01->00	TGACGGAAATTATTCA TCAACTTCGA ACCCAAAGAT ATAAAAACAGGGAAGC
adpU6;b4=0;b5=1;01->01	TGACGGAAATTATTCA AACGAACTCT TCATAACCGT ATAAAAACAGGGAAGC
adpU6;b4=1;b5=0;01->10	TGACGGAAATTATTCA ACACAGCATA AAGCATCCCT ATAAAAACAGGGAAGC
adpU6;b4=1;b5=1;01->11	TGACGGAAATTATTCA ACATGTCACT ACTTCTCGCT ATAAAAACAGGGAAGC
adpU6;b4=0;b5=0;10->00	TGACGGAAATTATTCA AGAAACCACA ACTACATGCA ATAAAAACAGGGAAGC
adpU6;b4=0;b5=1;10->01	TGACGGAAATTATTCA TGACAATCCA AGCAATACCA ATAAAAACAGGGAAGC
adpU6;b4=1;b5=0;10->10	TGACGGAAATTATTCA AAGTTTCCCA ACACATCCGA ATAAAAACAGGGAAGC
adpU6;b4=1;b5=1;10->11	TGACGGAAATTATTCA TGTCAACTCA ACTCTTCGCA ATAAAAACAGGGAAGC
adpU6;b4=0;b5=0;11->00	TGACGGAAATTATTCA ATACATCGCT TGCACACTAT ATAAAAACAGGGAAGC
adpU6;b4=0;b5=1;11->01	TGACGGAAATTATTCA AGACCCATTT ATAACTGCCA ATAAAAACAGGGAAGC
adpU6;b4=1;b5=0;11->10	TGACGGAAATTATTCA TGAACAACCT ACACGTACCA ATAAAAACAGGGAAGC
adpU6;b4=1;b5=1;11->11	TGACGGAAATTATTCA ACTTACACGT ACCCATTCGA ATAAAAACAGGGAAGC
adpU7;b5=0;b6=0	CTGAATTTACCGTTCC AATCACCCTT ACGCTTCTAT TTAAAGGTGAATTATC
adpU7;b5=0;b6=1	CTGAATTTACCGTTCC ACGTTACCAA ACGCTTCTAT TTAAAGGTGAATTATC
adpU7;b5=1;b6=0	CTGAATTTACCGTTCC AATCACCCTT TTTTCCCTGA TTAAAGGTGAATTATC
adpU7;b5=1;b6=1	CTGAATTTACCGTTCC ACGTTACCAA TTTTCCCTGA TTAAAGGTGAATTATC
adpU8;b6=0;_;0_->0_	ACGATCTAAAGTTTTG ATTCTACGCT TACACACACA AGTAAGCGTCATACAT
adpU8;b6=1;_;0_->1_	ACGATCTAAAGTTTTG ATTCCCTTGT AATCCTGCCA AGTAAGCGTCATACAT
adpU8;b6=0;_;1_->0_	ACGATCTAAAGTTTTG ATTTGTCCCA ATTAGCACCA AGTAAGCGTCATACAT
adpU8;b6=1;_;1_->1_	ACGATCTAAAGTTTTG AAACTGACCA ACCGATCACA AGTAAGCGTCATACAT

S11 DNA sequences for guard strands

There are 54 guard DNA sequences.

Name	DNA sequence
U1;__->__;ne_eg	TCTGCCTTATA
U1;__->__;sw_sg	AGATCCATCAT
U2;_0->_0;ne_eg	AATTTTCCGTT
U2;_0->_0;sw_sg	AAACGACAAAT
U2;_0->_0;se_sg	TGCTAGTTGT
U2;_0->_0;se_eg	TGGAAAGTGA
U2;_0->_1;ne_eg	TTCGTCAAATT
U2;_0->_1;se_eg	AGTTCGATGT
U3;00->00;ne_eg	TTATGACCTCT
U3;00->00;sw_sg	AAGACCTACTT
U3;00->00;se_sg	AGAGTCGAAA
U3;00->00;se_eg	TTGCGTTTTT
U3;00->01;ne_eg	TATCCATACGT
U3;00->01;se_eg	AGATGCTGAT
U3;00->10;sw_sg	AAAAACACACT
U3;00->10;se_sg	AAGAACGAGT
U4;00->00;ne_eg	TACTCCTCAAT
U4;00->00;sw_sg	ATACATCACCT
U4;00->00;se_sg	ATTTTTGCGT
U4;00->00;se_eg	TGGCTAGTTT
U4;00->01;ne_eg	TCCTTCTTGTA
U4;00->01;se_eg	TTGGGATTCA
U4;00->10;sw_sg	ATAGAACTCCA
U4;00->10;se_sg	AAAGAGCAGT
U5;00->00;ne_eg	TTCCCTTAAGT
U5;00->00;sw_sg	AAACCAATGAA
U5;00->00;se_sg	TGAAAGGACA
U5;00->00;se_eg	TAGTGCGAAT
U5;00->01;ne_eg	TTTCCAACATT
U5;00->01;se_eg	AAGAATCGGT
U5;00->10;sw_sg	TTATCCAGTCT
U5;00->10;se_sg	AAGATAGCGT
U6;00->00;ne_eg	ATAACTGTCCT
U6;00->00;sw_sg	TCATTACCTCT
U6;00->00;se_sg	AAAATTGCGT
U6;00->00;se_eg	TGAGTCGATT
U6;00->01;ne_eg	TCCTATATGCA
U6;00->01;se_eg	TGCTGGTATT
U6;00->10;sw_sg	ATTTCCACAAA
U6;00->10;se_sg	AATTCTGGGT
U7;00->00;ne_eg	TCTTACTTCCT
U7;00->00;sw_sg	AGACTATCACA
U7;00->00;se_sg	ATAGAAGCGT
U7;00->00;se_eg	AAGGGTGATT
U7;00->01;ne_eg	TCTGTCTACTT
U7;00->01;se_eg	TTGGTAACGT
U7;00->10;sw_sg	ATCTCCTACAA
U7;00->10;se_sg	TCAGGGAAAA
U8;0_->0_;ne_eg	TTACTACACGA
U8;0_->0_;sw_sg	AAATTGAACCA
U8;0_->0_;se_sg	AATCGTGGAT
U8;0_->0_;se_eg	TGTTTGGTCT
U8;0_->1_;sw_sg	AGTCTCATCAT
U8;0_->1_;se_sg	TGAACGGTTA

S12 DNA sequences for 16-helix DNA origami barrel-shaped seed

M13mp18 scaffold strand. M13mp18 was used as scaffold strand, and in the cadnano (Ref. [72] of Supplementary Information A, http://cadnano.org/) design the M13mp18 strand started at position 5588 of M13 relative to the starting position given in the GenBank entry for M13mp18; GenBank submission X02513.1, https://www.ncbi.nlm.nih.gov/nuccore/X02513.1.

Staples. There are 208 DNA origami staple strands, 87 of which were ordered with and without a 5′ biotin modification. Only those with the modification, denoted `/5Biosg/`, are listed below. See Figure S15 of Supplementary Information A for a graphical layout showing which staple strands do, and do not, have 5′ biotin modifications. Staples are named according to the cadnano coordinates of their 5′ and 3′ ends. There are 26 staples that have an 8-base toehold extension for unzipping, see Section S5.3.1 in Supplementary Information A.

5’	3’	DNA sequence
3[32]	5[31]	CGAAAGAGGGTAGTAAATTGGGCTGAATTACC
5[32]	7[31]	TTATGCGAGCTTTAAACAGTTCAGTCTTTAC
7[32]	9[31]	CCTGACTATTGTTTAGCTATATTTTATTCTACT
9[32]	11[31]	AATAGTAGTCTGAGAGTCTGGAGCACTAGCAT
11[32]	13[31]	GTCAATCAGATCGCACTCCAGCCCAGGCAAA
13[32]	15[31]	GCGCCATTCCGCTCACTGCCCGCTTTAATGAAT
15[32]	17[31]	CGGCCAACGGGTCGAGGTGCCGTACGATTTAG
18[39]	3[31]	ATGAATAAAGCTTGACAGTTTCCATTAAACGGACCTAAAA
1[40]	16[48]	GAAGGTATATGAGGAGGGGAAAGCCGGCGAAAATCAAGT
4[47]	2[48]	AGAACGACAAAAGAATACACTACTTTTTC
6[47]	4[48]	/5Biosg/CTCAAATTTTTAAGAACTGGCTAGAAACACC
8[47]	6[48]	/5Biosg/AATAACCTATAGTCAGAAGCATGAATCCCC
10[47]	8[48]	/5Biosg/TCATTGCAGCATTAACATCCAAAATGGTC
12[47]	10[48]	/5Biosg/TCAGGAATATGTACCCCGGTTGGCTATCAGG
14[47]	12[48]	TGCGTTGGCCATTCAGGCTGCGTATCGGCC
16[47]	14[48]	TTTTTGGCGCGGGGAGAGGCGACATTAAT
3[64]	5[63]	CATCTTTGAAGGCTTGCCCTGACGCATTATAC
5[64]	7[63]	/5Biosg/CAGTCAGGGTCATAAATATTCATAAGCGGAT
7[64]	9[63]	/5Biosg/TGCATCAAAATTAGATACATTTCGCATAAATCA
9[64]	11[63]	TACAGGCAAGAGAGATCTACAAAGATAATCAG
11[64]	13[63]	AAAAGCCCGAGGGGACGACGACAGCAACTGT
13[64]	15[63]	/5Biosg/TGGGAAGGGATGAGTGAGCTAACTCGTTTGCGT
15[64]	17[63]	ATTGGGCGCCGTGAACCATCACCCACGTGGCG
18[71]	3[63]	TTGTGGATAGAAAGGAGCTTTGAGGACTAAAGAAAACACT
1[72]	16[80]	ATAGAGTACTACAGAGAGGGAATTTTATAATCAGGGCGATG
4[79]	2[80]	/5Biosg/AGTGAATACCCCCAGCGATTATAAGCAACGG
6[79]	4[80]	GCGGAATCACGTTGGGAAGAAAAATGCTCATTC
8[79]	6[80]	/5Biosg/GTTTGACCAAGATTAAGAGGAAGTCCAATACT
10[79]	8[80]	CTATTTTTGGCAAAGAATTAGCATAGATTTA
12[79]	10[80]	GCCAGTTTCAAAAACAGGAAGATTAGAGGGTAG
14[79]	12[80]	/5Biosg/GGTGCCTACGATCGGTGCGGGCCCGTGCATCT
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3[96]	5[95]	/5Biosg/CGAAACAAACAACGTAACAAAGCTCTACGT
5[96]	7[95]	/5Biosg/TAATAAAATAGACTGGATAGCGCCCGAAA
7[96]	9[95]	/5Biosg/GACTTCAAAAATTCTGCGAACGAGAAATTAA
9[96]	11[95]	/5Biosg/GCAATAAAGTAAATTAATGCCGGGTATAAG
11[96]	13[95]	/5Biosg/CAAATATTGGGCGCATCGTAACTCTTCGC
13[96]	15[95]	/5Biosg/TATTACGCCGAAGCATAAAGTGTATTTCACC
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18[103]	3[95]	AAAAATATCCACCGAGCATCGGAACGAGGGTCCAAGCG
1[104]	16[112]	TGGATGGTAAAGACAGTAAAAGAGTCTGTCCATCCAACGTC
4[111]	2[112]	/5Biosg/ACCCAAATGTACAACGGAGATTTCAGCAGCG
6[111]	4[112]	AAAATGTTCGAACTAACGGAACAAATATTCATT
8[111]	6[112]	TGATTCCCTATCGCGTTTTAATTGGTAATAGT
10[111]	8[112]	/5Biosg/CTAGCTGACCTCAGAGCATAAAGATAACAGT
12[111]	10[112]	GTGTAGATTAAATTGTAAACGTTATCAACCGTT
14[111]	12[112]	/5Biosg/ACGAGCCGAGCTGGCGAAAGGGGGTCACGTTG
16[111]	14[112]	AAAGGGCGGGCAACAGCTGATTGCACAACAT
3[128]	5[127]	TTGCCTGATAACTTGACAAGAACCGGCATTATTA
5[128]	7[127]	/5Biosg/CAGGTAGAAGTTTTGCCAGAGGGCGAGCTTC
7[128]	9[127]	AAAGCGAACGGAAGTTTCATTCCATCTAAATCG

9[128] 11[127] /5Biosg/GTTGTACCACCATCAATATGATATATATTTTG
11[128] 13[127] /5Biosg/TTAAAATTACCGTAATGGGATAGGATGTGCT
13[128] 15[127] /5Biosg/GCAAGGCGATCCGCTCACAATTCCACCCTTCAC
15[128] 17[127] CGCCTGGCCTTAAAGAACGTGGACTCACGCAA
18[135] 3[127] TTAGGTGGATTAACCGGCGGGATCGTCACCCTGTATCATC
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4[143] 2[144] GAGTAATATTGTGTCGAAATCTTAAAGGC
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3[160] 5[159] GCTCCATGTCATAGGCTGGCTGACAGATTTAG
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7[160] 9[159] AGGTCAGGAGTTTTAAATATGCAACCTGTAATA
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14[207] 13[223] /5Biosg/TAGAGGATGCTTGCATGCCTGCAGTACCTGAG
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13[224] 14[208] /5Biosg/CAAAAGAAAATTATTCATTTCAATGTCGACTC
15[224] 16[208] /5Biosg/GGAGCACTGGAAGGTTATCTAAAAGGCAAAAT
18[231] 2[208] TGTTAGTGACAATATTACCGATAGTTGCGCCGACAATGAC
1[232] 16[240] TTTATTATGCTTGATACCGCCAGCCATTGCAGTTGAAAG
4[239] 2[240] /5Biosg/AAGTGCCTAGGTGTATCACCGCTTAAACA
6[239] 4[240] TAGCGTTCAGAGCCACCACCGGCAGGCGGAT
8[239] 6[240] AACCGAGCTGGCATGATTAAGCCCCCTTAT
10[239] 8[240] /5Biosg/GTATTCTCTTGCGGGAGGTTTCAGAAGGA
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5[256] 7[255] /5Biosg/CCCTCAGACATTTTCGGTCATAGACTCCTTAT
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9[256] 11[255] /5Biosg/AAATCAAGAATCAGATATAGAAGTACCAGTA
11[256] 13[255] /5Biosg/TAAAGCCAGCGTTAAATAAGAATCATCAAGAA
13[256] 15[255] /5Biosg/AACAAAATGAATACCAAGTTACAATAGAGCCGT
15[256] 17[255] CAATAGATAGTTGGCAAATCAACAACAGGAA

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1[264]   16[272]   TATGAAAGTCAGCTTGATGGAAATACCTACATTCAATCAAT
4[271]   2[272]    ATTAGCGGACCGCCACCCTCAGATCGGTTTA
6[271]   4[272]    /5Biosg/TTCATCGGGCCGCCACCCTCAGAAAGGATTAGG
8[271]   6[272]    /5Biosg/AAGCAGATATGTTAGCAAACGTATAGCGCGTT
10[271]  8[272]    /5Biosg/AGCAAGCAATTAGTTGCTATTTTAGAAAAGT
12[271]  10[272]   /5Biosg/TAAATAAGACGCTCAACAGTAGGGGCGCCCAAT
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16[271]  14[272]   ATCTGGTCAATACATTTGAGGATTTCGCCTG
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5[288]   7[287]    CCTCAGAGTTAGCGTCAGACTGGAAAATAC
7[288]   9[287]    ATACATAACCGAAGCCCTTTTTAGCACCCAG
9[288]   11[287]   TTCTACAATTTAGGAATCATTACCCTTAATT
11[288]  13[287]   GAGAATCGGGTTTGAAATACCGATTTCATT
13[288]  15[287]   TGAATTACAGAAACAATAACGGATTAGAAGT
15[288]  17[287]   ATTAGACTCAAATATCAAACCCTTTGACG
18[295]  3[287]    GATTAAAACTCAATCGGAGCCTTTAATTGTAACCGCCAC
1[296]   16[304]   TTAAGAGATCCAAAAGTCTGAAATGGATTATTATCACCTTG
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6[303]   4[304]    /5Biosg/GTTTGCCTCCACCACCCTCAGAGCAAGTATTAA
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16[303]  14[304]   CTGAACCTTTACAAACAATTCGATACCTTTT
3[320]   5[319]    TCATTTTCTATTCTGAAACATGACGCCACCA
5[320]   7[319]    /5Biosg/GAACCACCCGTAATCAGTAGCGAAAAGAAACG
7[320]   9[319]    /5Biosg/CAAAGACACAAGAAACAATGAAATCCAACGCTA
9[320]   11[319]   ACGAGCGTCGAGAACAAGCAAGCCAACATGT
11[320]  13[319]   AATTTAGGTAGTTAATTTCATCTCAGTACATA
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18[327]  3[319]    TTAAATGTCAGATTCAGTTGAAAATCTCCAAACCACCACCC
1[328]   16[336]   GGGTTGGTTTTTCACCCAGTCACACGACCAGAGAGCCAG
4[335]   2[336]    /5Biosg/AACCTATAGGGATAGCAAGCCTAATAATT
6[335]   4[336]    GCAGCACACCAGAGCCGCCGCCCTATTTCGG
8[335]   6[336]    /5Biosg/ATAAGAGCCACGGAATAAGTTCCATCGATA
10[335]  8[336]    CACTCATCTTTCCAGAGCCTAGCCCAATA
12[335]  10[336]   TATATTTCAGAGGCATTTTCGACAAGTACCG
14[335]  12[336]   /5Biosg/GTCAGATTATGTGAGTGAATATTTTTCAAA
16[335]  14[336]   CAGCAAATTTGCCCGAACGTTGGTTTAAC
3[352]   5[351]    /5Biosg/CCCATGTAGTTAATGCCCCCTGCAGCATTGA
5[352]   7[351]    /5Biosg/CAGGAGGTACGTCACCAATGAAATATTTTGTC
7[352]   9[351]    /5Biosg/ACAATCAAACAAGAATTGAGTTAAATTTGCCAG
9[352]   11[351]   /5Biosg/TTACAAAAGAACGGGTATTAAACGCCAGTAA
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18[359]  3[351]    GATGTGGAAGGGACATCTAAAGGAATTGCGAACAATAGGAA
1[360]   16[368]   TTAGTGAAAGGAACAATCTGGCCAACAGAGATAGTATTAAC
4[367]   2[368]    /5Biosg/TATAAACACCGTAACACTGAGTTGAATAGAA
6[367]   4[368]    GGCCGGAATGAGGCAGGTCAGACGCAGTGCCCG
8[367]   6[368]    GATAACCCTAGAAAATTCATATGCATTAGCAA
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14[367]  12[368]   /5Biosg/ATAAAGAACGTCGCTATTAATTAATCCAATCG
16[367]  14[368]   TTACCGCCTGGAGTAACATTATCATAAACAGAA
3[384]   5[383]    AGTACAAAAGTGCCTTGAGTAAATTGGCC
5[384]   7[383]    /5Biosg/TTGATATTAGTAGCACCATTACGTTTACCA
7[384]   9[383]    GCGCCAAATAATTGAGCGCTAATTTTATCCC
9[384]   11[383]   /5Biosg/AATCCAAAAATAATCGGCTGTCAAGGTAA
11[384]  13[383]   /5Biosg/AGTAATTCAAATGCTGATGCAAATTTTCCC
13[384]  15[383]   /5Biosg/TTAGAATCAATTATTTGCACGTATTTGCGGA
15[384]  17[383]   ACAAAGAAGAGGTGAGGCGGTCAGAACCC
18[391]  3[383]    AAGGTAGGTTCTGACCGTTTCAGCGGAGTGATCGTCACC
1[392]   16[400]   AAGGAAAGTTTCAACATGAAAGCGTAAGAATACAGCAGAAG
4[399]   2[400]    /5Biosg/ACGGGGTCCTACAACGCCTGTAGTAAACAAC
6[399]   4[400]    /5Biosg/AAATCACCCACAAACAAATAAATCTAAGTTTTA
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13[416]  15[415]   TTATTAAGACAATAATGGAAGGGTTAGGAATTATC
3[416]   5[415]    GACAGCCCGGAGTGTACTGGTAACTCATTAA
5[416]   7[415]    AGCCAGAAGCCATTTGGGAATTATTCAACCGA
7[416]   9[415]    TTGAGGGAATTAACTGAACACCCTTGTTTAACG
9[416]   11[415]   TCAAAAATCATCCTAATTTACGAATAAACAA
11[416]  13[415]   CATGTTCATCCGGCTTAGGTTGGATAGCTTAG
15[416]  17[415]   ATCATATTTACCGAACGAACCACCGTGGCAC
18[423]  3[415]    TATAGGGAAGACAATACTGTATGGGATTTTGCCATTCCACA
1[424]   16[432]   GTGGGGTGGAATTTTTTTTTGAATGGCTATACATCGCCA
4[431]   2[432]    TGATACATCATAGTTAGCGTATAGTAAAT
6[431]   4[432]    GACTTGATGGAAAGCGCAGTCTGGCTTTTGA
8[431]   6[432]    TTCGGGAGAGGGAAGGTAAATATACCGTCACC
10[431]  8[432]    AATATCCGAAAATAGCAGCCTGCATTAGA
12[431]  10[432]   TTTAACCGCTAATGCAGAACGCAAGAAAAAT
14[431]  12[432]   ACTTCTGGCTGAGAAGAGTCAGACTACCTT
16[431]  14[432]   TTAAAAACCTGATTATCAGATTGGATTAT
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S13 DNA sequences for nucleation study on SST nanotubes

DNA sequences for the nucleation study described in Section S5.1.1 of Supplementary Information A were taken directly from reference [13] (also in Supplementary Information A) for 6-helix, 8-helix, 10-helix SST periodic nanotubes. For 12-helix, 14-helix, 16-helix, nanotubes the sequences below were used. Specifically, to make a nanotube with k helices for $k \in \{8, 10, 12, 14, 16\}$ one uses strands U1-cy3, U2, ..., U($k-1$), Nk; although U1-alexa647 was sometimes used instead of U1-cy3. The strand U1-quench is complementary to the 16 bases of U1-cy3 and U1-alexa647, and was used to lower the amount of background fluorescence during imaging (i.e. after samples are lowered to room temperature, the strand with the quencher binds to U1-cy3 free tiles, similarly to how we use guard strands). The strand U1-quench was added at the beginning of the experiment (i.e. it is with the tile strands during the entire temperature hold experiment).

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Name         DNA sequence
U1-cy3       /5Cy3/TT GGCGATTAGGA CGCTAAGCCA CCTTTAGATC CTGTATCTGGT
U1-alexa647 /5Alex647N/TT GGCGATTAGGA CGCTAAGCCA CCTTTAGATC CTGTATCTGGT
U2           GGATCTAAAG GACCAGATACA CCACTCTTCCT GACATCTTGT
U3           GGAAGAGTGGA CAAGATGTCA CCGTGAGAAC CTGCAATGCGT
U4           GGTTCTCACG GACGCATTGCA CCGCACGACCT GTTCGACAGT
U5           GGTCGTGCGGA CTGTCGAACA CCAACGATGC CTGATAGAAGT
U6           GGCATCGTTG GACTTCTATCA ATGCACCTCCA GCTTTGAATG
U7           GGAGGTGCATC ATTCAAAGCT AACGGTAACT ATGACTTGGGA
U8           TAGTTACCGT TTCCCAAGTCA AACACTAGACA CATGCTCCTA
U9           GTCTAGTGTTT AGGAGCATGT CGAGACTACA CCCTTGCCACC
U10          GTGTAGTCTC GGGTGGCAAGG TACTACCGCTC CATTAAGAAT
U11          GAGCGGTAGTA ATTCTTAATG ATCCGTCTAT CTACACTATCA
U12          GATAGACGGA TTGATAGTGTA AGACGAAATCA GCAGAACTAA
U13          TGATTTCGTCT TTAGTTCTGC CTGCGAAGTA ATCAGCCGAGC
U14          TTACTTCGCA GGCTCGGCTGA GAACTCGCTCC AGAATCGACG
U15          GGAGCGAGTTC CGTCGATTCT AACTTTCAAT ATCATATCGTA

N8           TAGTTACCGT TTCCCAAGTCA CCTAATCGCCT GGCTTAGCGT
N10          GTGTAGTCTC GGGTGGCAAGG CCTAATCGCCT GGCTTAGCGT
N12          GATAGACGGA TTGATAGTGTA CCTAATCGCCT GGCTTAGCGT
N14          TTACTTCGCA GGCTCGGCTGA CCTAATCGCCT GGCTTAGCGT
N16          TATTGAAAGT TTACGATATGA CCTAATCGCCT GGCTTAGCGT
U1-quench    AGCG TCCTAATCGCC/3BHQ_2/
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