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Supplementary Materials for

Molecular communication relays for dynamic cross-regulation of self-sorting fibrillar self-assemblies

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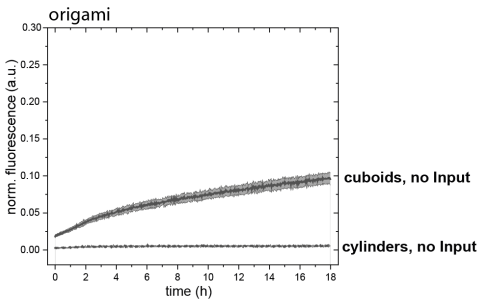


Figure S1. Leakage check without Input addition. Time-resolved normalized fluorescence of 10 nM cuboids (solid line) and 10 nM cylinders (dotted line) without Input addition for reference. All fluorescence measurements are an average of two, the shaded area is the standard deviation.

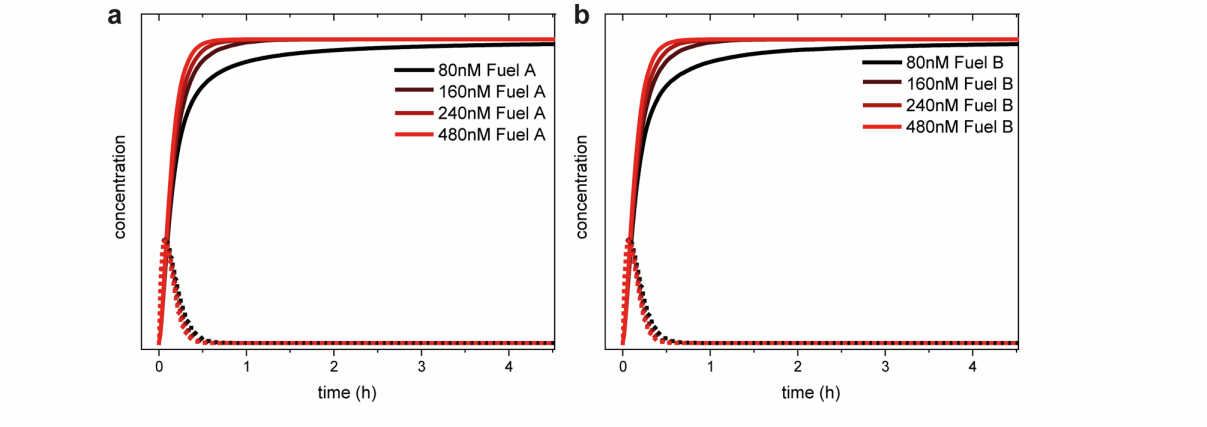


Figure S2. DSD simulations of the amplification module for all fuel concentrations. DSD predicts the behavior of the unquenched Cy3 species (solid lines) and unquenched Cy5 species (dotted lines). c1/Activator, c1*, Input at 160 nM, Inhibitor/c2, c2* at 240 nM. (a) DSD simulations of Fuel A. (b) DSD simulations of Fuel B.

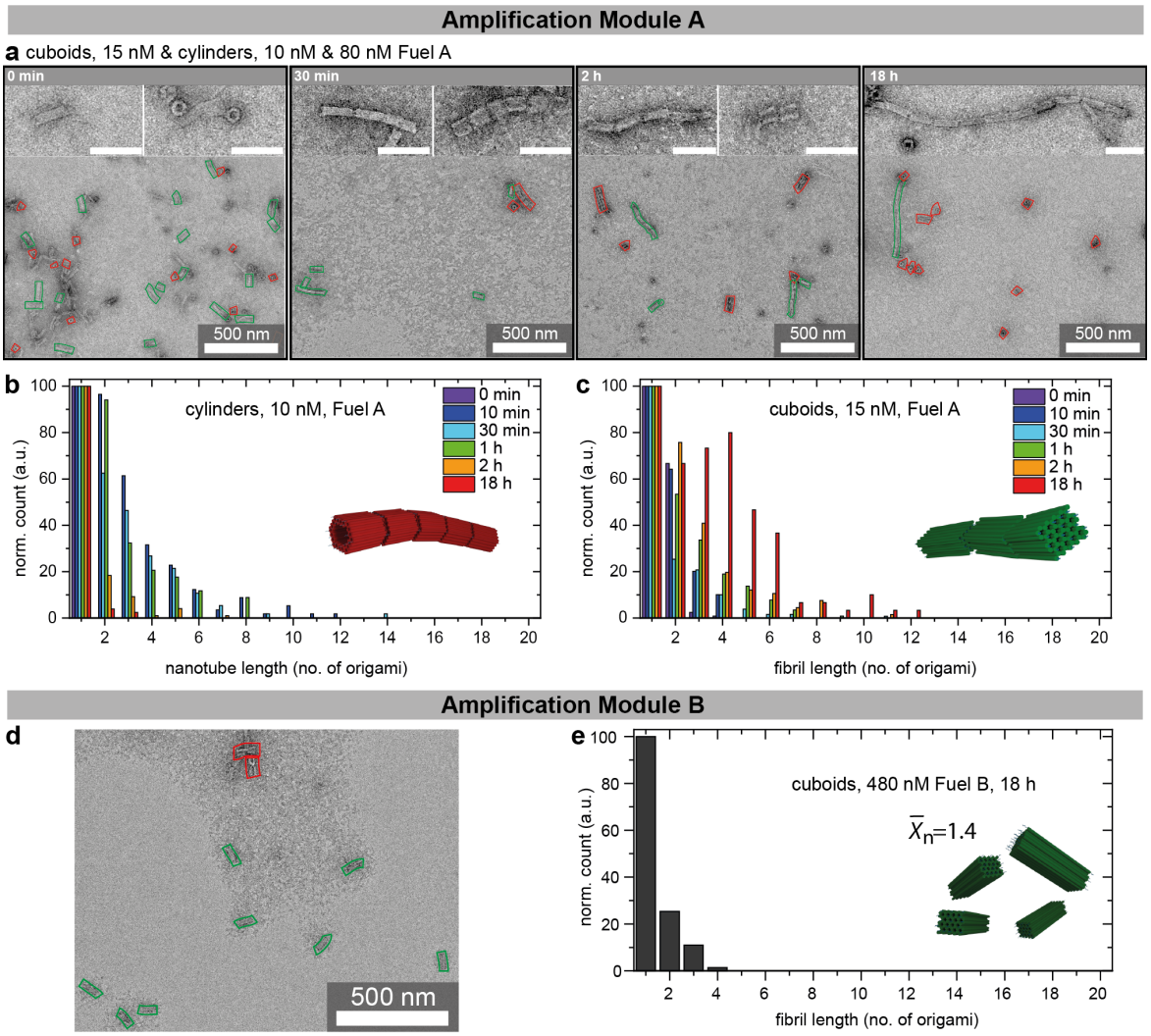


Figure S3. TEM image analysis of the amplification modules. (a) TEM images of DNA origami polymerization at 0 min, 30 min, 2 h and 18 h in presence of 80 nM Fuel A using 15 nM cuboids (green) and 10 nM cylinders (red). Scale bars of insets are 100 nm. **(b)** Statistical TEM image analysis of nanotube lengths in presence of 80 nM Fuel A using 15 nM cuboids and 10 nM cylinders. **(c)** Statistical TEM image analysis of cuboid fibril lengths in presence of 80 nM Fuel A using 15 nM cuboids and 10 nM cylinders. **(d)** TEM image of DNA origami polymerization after 18 h in presence of 480 nM Fuel B using 15 nM cuboids (green) and 10 nM cylinders (red). **(e)** Statistical TEM image analysis of cuboid fibril lengths after 18 h with 480 nM Fuel B. Colored lines are added as guide to the eye for identifying both origami types. Scale bar of inset is 100 nm.

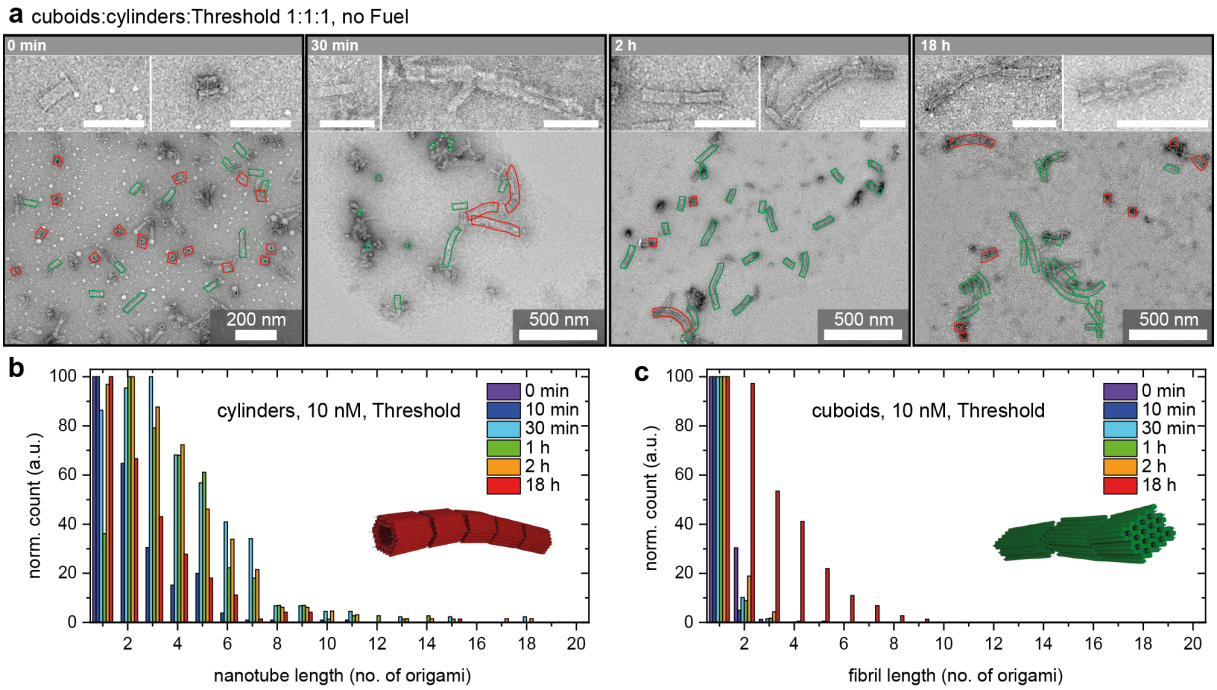


Figure S4. TEM image analysis of the threshold module. (a) TEM images of DNA origami polymerization at 0 min, 30 min, 2 h and 18 h in presence of 160 nM Threshold using 10 nM cuboids (green) and 10 nM cylinders (red). Colored lines are added as guide to the eye for identifying both origami types. Scale bars of insets are 100 nm. **(b)** Statistical TEM image analysis of nanotube length distribution in presence of 160 nM Threshold using 10 nM cuboids and 10 nM cylinders. **(c)** Statistical TEM image analysis of cuboid fibril length distribution in presence of 160 nM Threshold using 10 nM cuboids and 10 nM cylinders.

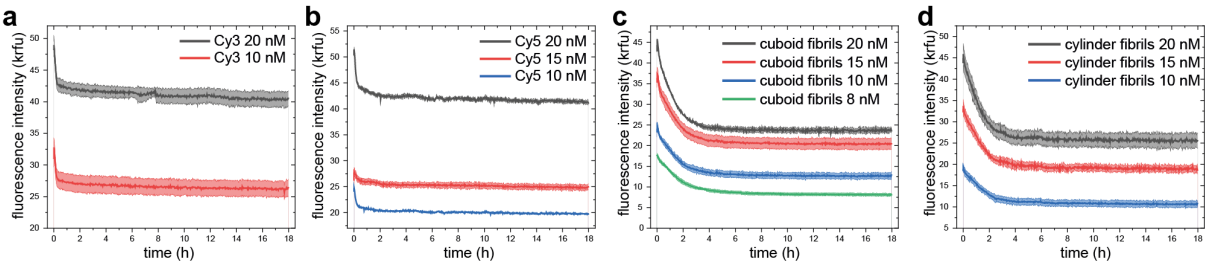


Figure S5. Reference measurements for normalizing fluorescence. (a) Time-resolved fluorescence of the c2(Cy3)/Activator/c2* complex. **(b)** Time-resolved fluorescence of the c1(Cy5)/Input/c1* complex. **(c)** Time-resolved fluorescence of cuboid fibrils pre-formed during origami folding and purified for normalizing. **(d)** Time-resolved fluorescence of cylinder nanotubes pre-formed during origami folding and purified for normalizing.

Note S1. Visual DSD code for the negative feedback loop.

```
directive simulation {
 final=65000;
}
directive simulator deterministic

directive rules {
bind(P1,P2,Q,D!i) :-
P1 = C1 [D@X], compl(D, D'), P2 = C2 [D'@Y],
Q = C1 [D!i] | C2 [D'!i], freshBond(D!i, P1|P2),
not hidden(D@X, P1),
not hidden(D'@Y, P2).
bind(P,Q,D!i) :-
P = C [D @ X][D' @ Y], compl(D, D'),
Q = C [D!i] [D'!i], freshBond(D!i, P),
not hidden(D @ X, P),
not hidden(D' @ Y, P).
displace(P,Q,E!j,D!i) :-
P = C [E!j D] [D!i] [D'!i E'!k], junction(E!j, E'!k, P),
Q = C [E!j D!i] [D] [D'!i E'!k].
displaceL(P,Q,E!j,D!i) :-
P = C [D!i] [D E!j] [E'!k D'!i], junction(E!j, E'!k, P),
Q = C [D] [D!i E!j] [E'!k D'!i].
unbind(P,Q,D!i) :-
P = C [D!i] [D'!i], toehold(D),
Q = C [D] [D'], not adjacent(D!i,_,P).
adjacent(D!i,E!j,P) :- P = C [D!i E!j] [E'!j D'!i].
adjacent(D!i,E!j,P) :- P = C [E!j D!i] [D'!i E'!j].
```

```
cover(P,Q,E!j,D!i) :-
P = C [E!j D] [D' E'!j], compl(D, D'),
Q = C [E!j D!i] [D'!i E'!j], freshBond(D!i,P).
coverL(P,Q,E!j,D!i) :-
P = C [D E!j] [E'!j D'], compl(D, D'),
Q = C [D!i E!j] [E'!j D'!i], freshBond(D!i,P).
binds(P1,P2,R,D!i,[D#L]) :- bind(P1,P2,Q,D!i), not coverL(Q,_,D!i,_), covers(Q,R,D!i,L).
binds(P1,P2,Q,D!i,[D]) :- bind(P1,P2,Q,D!i), not coverL(Q,_,D!i,_), not cover(Q,_,D!i,_).
displaces(P,R,E!j,[D#L]) :- displace(P,Q,E!j,D!i), displaces(Q,R,D!i,L).
displaces(P,Q,E!j,[D]) :- displace(P,Q,E!j,D!i), not displace(Q,_,D!i,_).
displacesL(P,R,E!j,[D#L]) :- displaceL(P,Q,E!j,D!i), displacesL(Q,R,D!i,L).
displacesL(P,Q,E!j,[D]) :- displaceL(P,Q,E!j,D!i), not displaceL(Q,_,D!i,_).
covers(P,R,E!j,[D#L]) :- cover(P,Q,E!j,D!i), covers(Q,R,D!i,L).
covers(P,Q,E!j,[D]) :- cover(P,Q,E!j,D!i), not cover(Q,_,D!i,_).
coversL(P,R,E!j,[D#L]) :- coverL(P,Q,E!j,D!i), coversL(Q,R,D!i,L).
coversL(P,Q,E!j,[D]) :- coverL(P,Q,E!j,D!i), not coverL(Q,_,D!i,_).
unbinds(P,R,D!i,[D#L]) :-
P = C [D!i E!j] [E'!j D'!i], toehold(D), not boundL(D!i,_,P),
Q = C [D E!j] [E'!j D'], unbinds(Q,R,E!j,L).
boundL(D!i,E!j,P) :- P = C [E!j D!i] [D'!i E'!j].
unbinds(P,Q,D!i,[D]) :- unbind(P,Q,D!i).
(* auxiliary functions *)
hidden(D@X, P) :-
unbound(D),
P = C [A@End D@X B@Start],
path(B@Start, _@End, P, "right", [], Path).
hidden(D@X, P) :-
unbound(D),
P = C [B@Start D@X A@End],
path(B@Start, _@End, P, "left", [], Path).
(* path predicate: find a @Path from @Start to @End *)
path(_@End, _@End, _, _, Visited, Path) :-
reverse(Visited, Path).
path(X@Start, _@End, P, "left", Visited, Path) :-
not (Start = End),
P = C[Y@Start' X@Start],
not member(Y@Start', Visited),
path(Y@Start', _@End, P, "left", [X@Start # Visited], Path).
path(X@Start, _@End, P, "right", Visited, Path) :-
not (Start = End),
P = C[X@Start Y@Start'],
not member(Y@ Start', Visited),
path(Y@Start', _@End, P, "right", [X@Start # Visited], Path).
path(X@Start, _@End, P, "any", Visited, Path) :-
not (Start = End),
path(X@Start, _@End, P, "left", Visited, Path).
path(X@Start, _@End, P, "any", Visited, Path) :-
not (Start = End),
path(X@Start, _@End, P, "right", Visited, Path).
path(D!i@Start, _@End, P, _, Visited, Path) :-
not (Start = End),
P = C [D!i@Start] [D'!i@Start'],
not member(D'!i@Start', Visited),
path(D'!i@Start', _@End, P, "any", [D!i@Start # Visited], Path).
junction(A, B, P) :- junctionR(A, B, P, []).
junction(A, B, P) :- junctionL(A, B, P, []).
```

```
junctionR(_!j,_!j,_,_).
junctionR(E!j,F!k,Q,V):-
Q = C [F!k] [G!l E'!j] [E!j],
not member(X, V),
not member(Y, V),
junctionR(G!l,F!k,Q,[X;Y#V]).
junctionL(_!j,_!j,_, _).
junctionL(E!j,F!k,Q, V):-
Q = C [F!k] [E'!j@X G!l@Y] [E!j],
not member(X, V),
not member(Y, V),
junctionL(G!l,F!k,Q,[X;Y#V]).
(* infinite semantics *)
find(D,Type,Rate):- rate(D,Type,Rate).
find(D,Type,Rate):- default(D,Type,Rate), not rate(D,Type,_).
//order of find and binds clauses could be reversed.
slow(P1, P2, Rate, Q) :- find(L, "bind", Rate), binds(P1,P2,Q,_,L). //, productive(Q,_,_!i,L).
fast(P, Rate, Q) :- displaces(P,Q,_,L), find(L, "displace", Rate).
fast(P, Rate, Q) :- displacesL(P,Q,_,L), find(L, "displace", Rate).
fast(P, Rate, Q) :- covers(P,Q,_,L), find(L, "cover", Rate).
fast(P, Rate, Q) :- coversL(P,Q,_,L), find(L, "cover", Rate).
fast(P, Rate, Q) :- unbinds(P,Q,_,L), find(L, "unbind", Rate).
productive(P,Q,E!j,L) :- displaces(P,Q,E!j,L).
productive(P,Q,E!j,L) :- displacesL(P,Q,E!j,L).
productive(P,Q,E!j,L) :- covers(P,Q,E!j,L).
productive(P,Q,E!j,L) :- coversL(P,Q,E!j,L).
mergestep(P,Q,V) :- fast(P,_,Q), not member(Q,V).
merge(P,P,V) :- not fast(P,_,_).
merge(P,R,V) :- mergestep(P,Q,V), merge(Q,R,[Q#V]).
reaction([P1; P2], Rate, R) :- slow(P1, P2, Rate, Q), merge(Q,R,[(P1|P2);Q]).
reaction([P], Rate, R) :- slow(P, Rate, Q), merge(Q,R,[P;Q]).
infinite([P1; P2], Rate, R) :- slow(P1, P2, Rate, Q), merge(Q,R,[(P1|P2);Q]).
infinite([P], Rate, R) :- slow(P, Rate, Q), merge(Q,R,[P;Q]).
detailed([P1; P2], Rate, Q):- slow(P1, P2, Rate, Q).
detailed([P], Rate, Q) :- slow(P, Rate, Q).
detailed([P], Rate, Q) :- fast(P, Rate, Q).
default([_],"unbind",0.012).
default(_,"bind",0.00002).
default(_,"displace",1.0).
default(_,"cover",1.0).
}

( 160 [<a^!1 b^!2 c^!3 d^!4 e^>
   | <h* g^* d^*!4 c^*!3 f^* b^*!2 a^*!1>]
| 160 [<e^* d^* c^* b^* i*>]
| 160 [<i>]
| 160 [<f^ c^!11 d^!12 g^!13 k^!14>
   |<k^*!14 g^*!13 e^* d^*!12 c^*!11 b^* a^*>]
| 160 [<h>]
)
```

Note S2. CRN code for the basic negative feedback loop.

```
directive simulation {final=65000; plots=[sp_0; sp_1; sp_2; sp_3; sp_4; sp_5;
sp_6; sp_7; sp_8; sp_9; sp_10; sp_11; sp_12; sp_13; sp_14]; }
directive simulator deterministic

| 160 sp_0
| 160 sp_1
| 160 sp_2
| 160 sp_3
| 160 sp_4
| sp_1 + sp_2 ->{0.00015} sp_14
| sp_0 + sp_4 ->{0.00013} sp_11
| sp_1 + sp_0 ->{0.000041} sp_13 + sp_12
| sp_14 + sp_0 ->{0.000041} sp_10 + sp_12
| sp_13 + sp_2 ->{0.00015} sp_10
| sp_12 + sp_4 ->{0.00013} sp_7
| sp_3 + sp_12 ->{0.000021} sp_9 + sp_8
| sp_1 + sp_11 ->{0.000041} sp_13 + sp_7
| sp_14 + sp_11 ->{0.000041} sp_10 + sp_7
| sp_9 + sp_4 ->{0.00013} sp_6
| sp_0 + sp_8 ->{0.000041} sp_12 + sp_5
| sp_13 + sp_8 ->{0.000062} sp_1 + sp_5
| sp_8 + sp_11 ->{0.000041} sp_5 + sp_7
| sp_10 + sp_8 ->{0.000062} sp_14 + sp_5
| sp_3 + sp_7 ->{0.000021} sp_8 + sp_6
```

Note S3. CRN code for the negative feedback loop in presence of Fuel A.

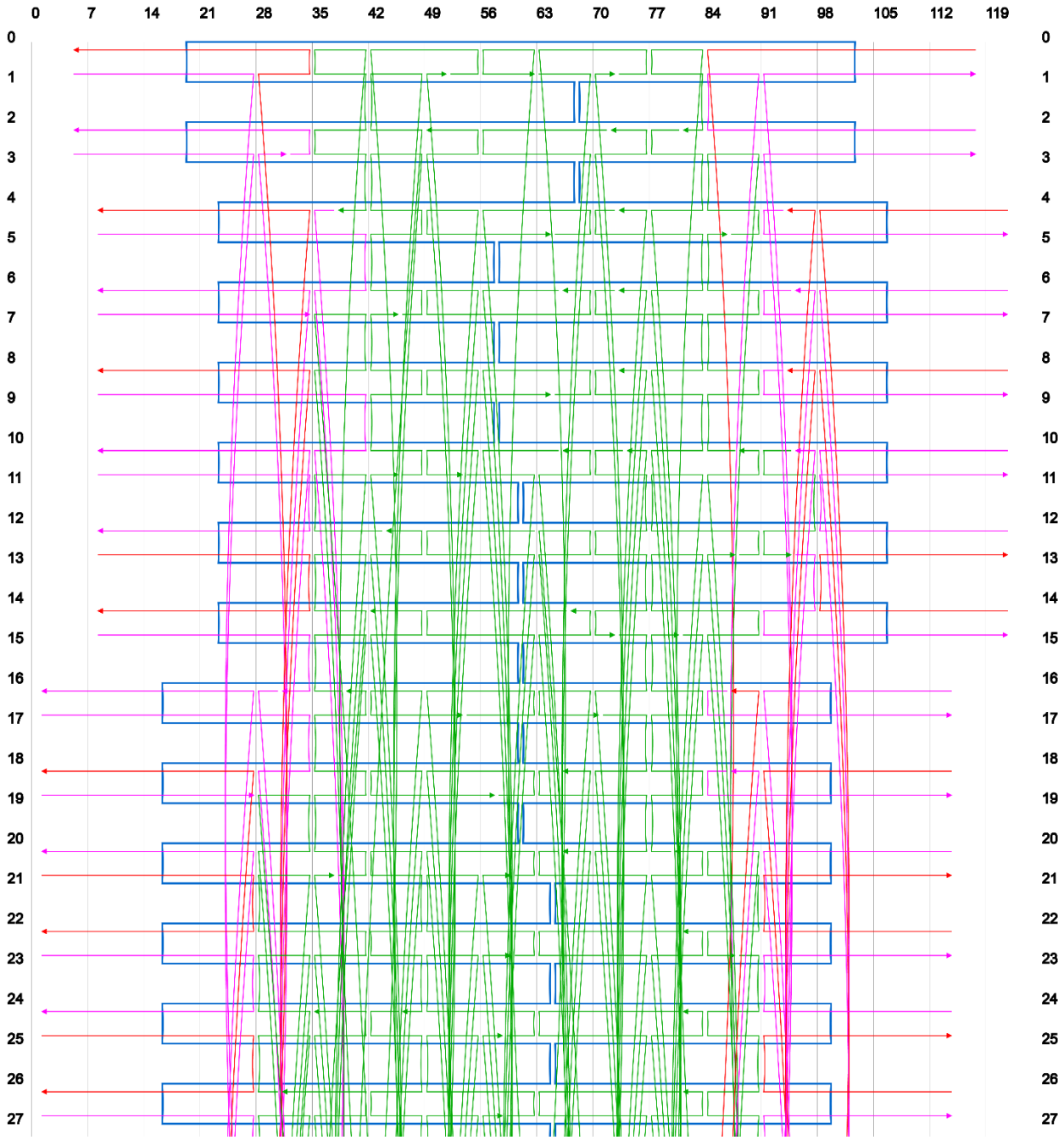
```
directive simulation {final=65000; plots=[sp_0; sp_1; sp_2; sp_3; sp_4; sp_5;
sp_6; sp_7; sp_8; sp_9; sp_10; sp_11; sp_12; sp_13; sp_14; sp_15; sp_16; sp_17;
sp_18]; }
directive simulator deterministic

| 160 sp_0
| 160 sp_1
| 160 sp_2
| 240 sp_3
| 240 sp_4
| 240 sp_5
| sp_4 + sp_5 ->{0.00013} sp_18
| sp_1 + sp_2 ->{0.00014} sp_17
| sp_0 + sp_4 ->{0.00013} sp_14
| sp_1 + sp_0 ->{0.000041} sp_16 + sp_15
| sp_17 + sp_0 ->{0.000041} sp_13 + sp_15
| sp_16 + sp_2 ->{0.00014} sp_13
| sp_15 + sp_4 ->{0.00013} sp_10
| sp_3 + sp_15 ->{0.000021} sp_12 + sp_11
| sp_1 + sp_14 ->{0.000041} sp_16 + sp_10
| sp_17 + sp_14 ->{0.000041} sp_13 + sp_10
| sp_12 + sp_4 ->{0.00013} sp_8
| sp_0 + sp_11 ->{0.000041} sp_15 + sp_6
| sp_16 + sp_11 ->{0.000062} sp_1 + sp_6
| sp_11 + sp_14 ->{0.000041} sp_6 + sp_10
| sp_13 + sp_11 ->{0.000062} sp_17 + sp_6
| sp_3 + sp_10 ->{0.000021} sp_11 + sp_8
| sp_12 + sp_18 <->{0.000040}{0.000021} sp_9 + sp_15
| sp_9 + sp_10 <->{0.000021}{0.000041} sp_18 + sp_8
| sp_7 + sp_4 ->{0.00013} sp_9
| sp_12 + sp_5 <->{0.00004}{0.000021} sp_7 + sp_15
| sp_5 + sp_8 <->{0.00004}{0.000021} sp_7 + sp_10
```

Note S4. CRN code for the negative feedback loop in presence of Threshold.

```
directive simulation {final=65000; plots=[sp_0; sp_1; sp_2; sp_3; sp_4; sp_5;
sp_6; sp_7; sp_8; sp_9; sp_10; sp_11; sp_12; sp_13; sp_14; sp_15; sp_16; sp_17;
sp_18; sp_19; sp_20; sp_21; sp_22]; }
directive simulator deterministic

| 160 sp_0
| 160 sp_1
| 160 sp_2
| 160 sp_3
| 160 sp_4
| 160 sp_5
| 160 sp_6
| sp_4 + sp_5 ->{0.00013} sp_22
| sp_1 + sp_2 ->{0.00014} sp_21
| sp_0 + sp_4 ->{0.00013} sp_18
| sp_1 + sp_0 ->{0.000041} sp_20 + sp_19
| sp_21 + sp_0 ->{0.000041} sp_17 + sp_19
| sp_20 + sp_2 ->{0.00014} sp_17
| sp_6 + sp_19 ->{0.000039} sp_12 + sp_19
| sp_6 + sp_19 ->{0.000039} sp_13
| sp_19 + sp_4 ->{0.00013} sp_14
| sp_3 + sp_19 ->{0.000021} sp_16 + sp_15
| sp_1 + sp_18 ->{0.000041} sp_20 + sp_14
| sp_21 + sp_18 ->{0.000412} sp_17 + sp_14
| sp_16 + sp_4 ->{0.00013} sp_10
| sp_0 + sp_15 ->{0.000041} sp_19 + sp_8
| sp_20 + sp_15 ->{0.000062} sp_1 + sp_8
| sp_15 + sp_18 ->{0.000041} sp_8 + sp_14
| sp_17 + sp_15 ->{0.000062} sp_21 + sp_8
| sp_6 + sp_14 ->{0.000039} sp_12 + sp_14
| sp_6 + sp_14 ->{0.000039} sp_7
| sp_3 + sp_14 ->{0.000021} sp_15 + sp_10
| sp_13 + sp_4 ->{0.00013} sp_7
| sp_12 + sp_19 ->{0.000039} sp_13
| sp_12 + sp_14 ->{0.000039} sp_7
| sp_16 + sp_22 <->{0.00004}{0.000021} sp_11 + sp_19
| sp_11 + sp_14 <->{0.000021}{0.00004} sp_22 + sp_10
| sp_9 + sp_4 ->{0.00013} sp_11
| sp_16 + sp_5 <->{0.00004}{0.000021} sp_9 + sp_19
| sp_5 + sp_10 <->{0.00004}{0.000021} sp_9 + sp_14
```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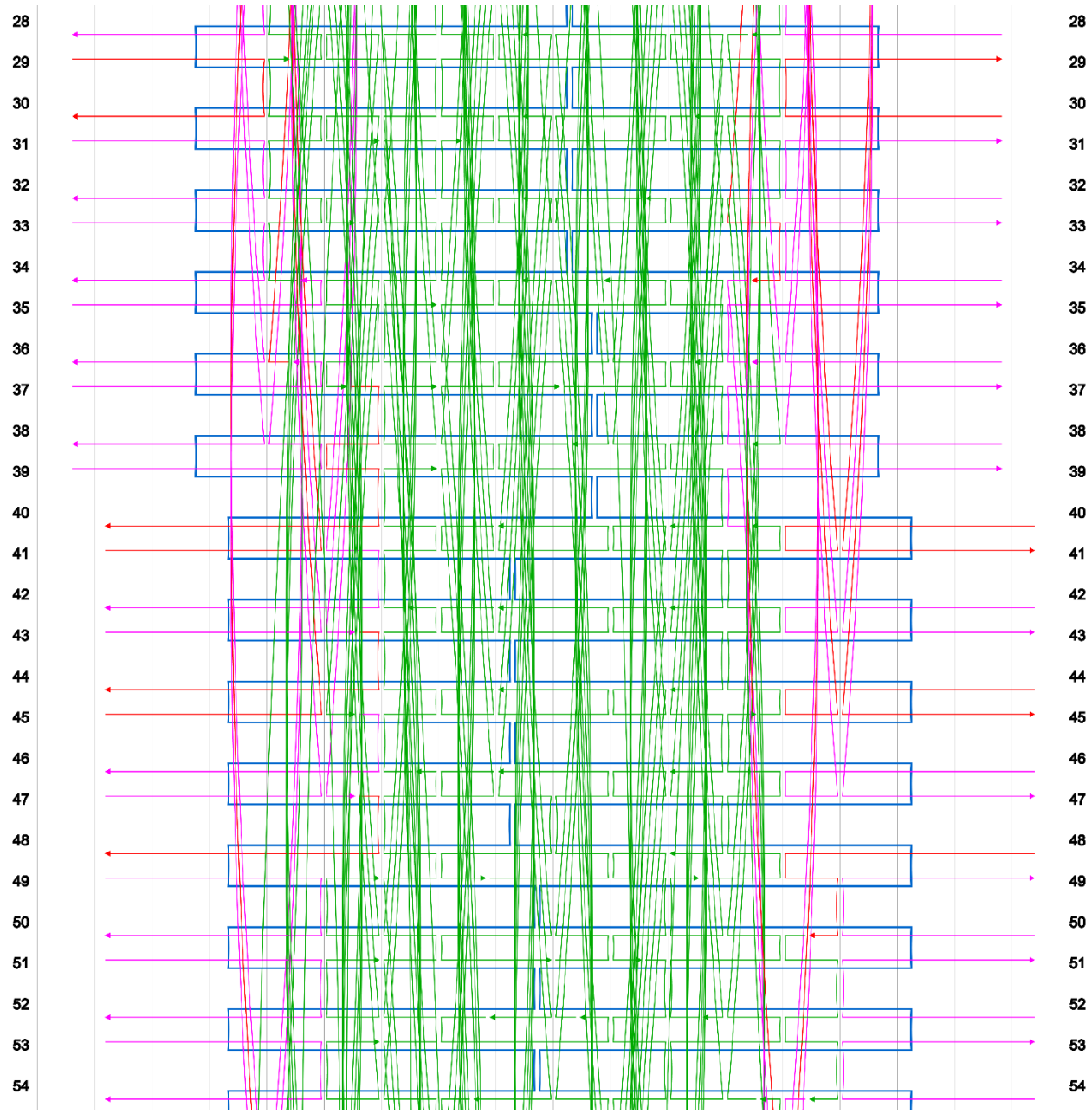
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27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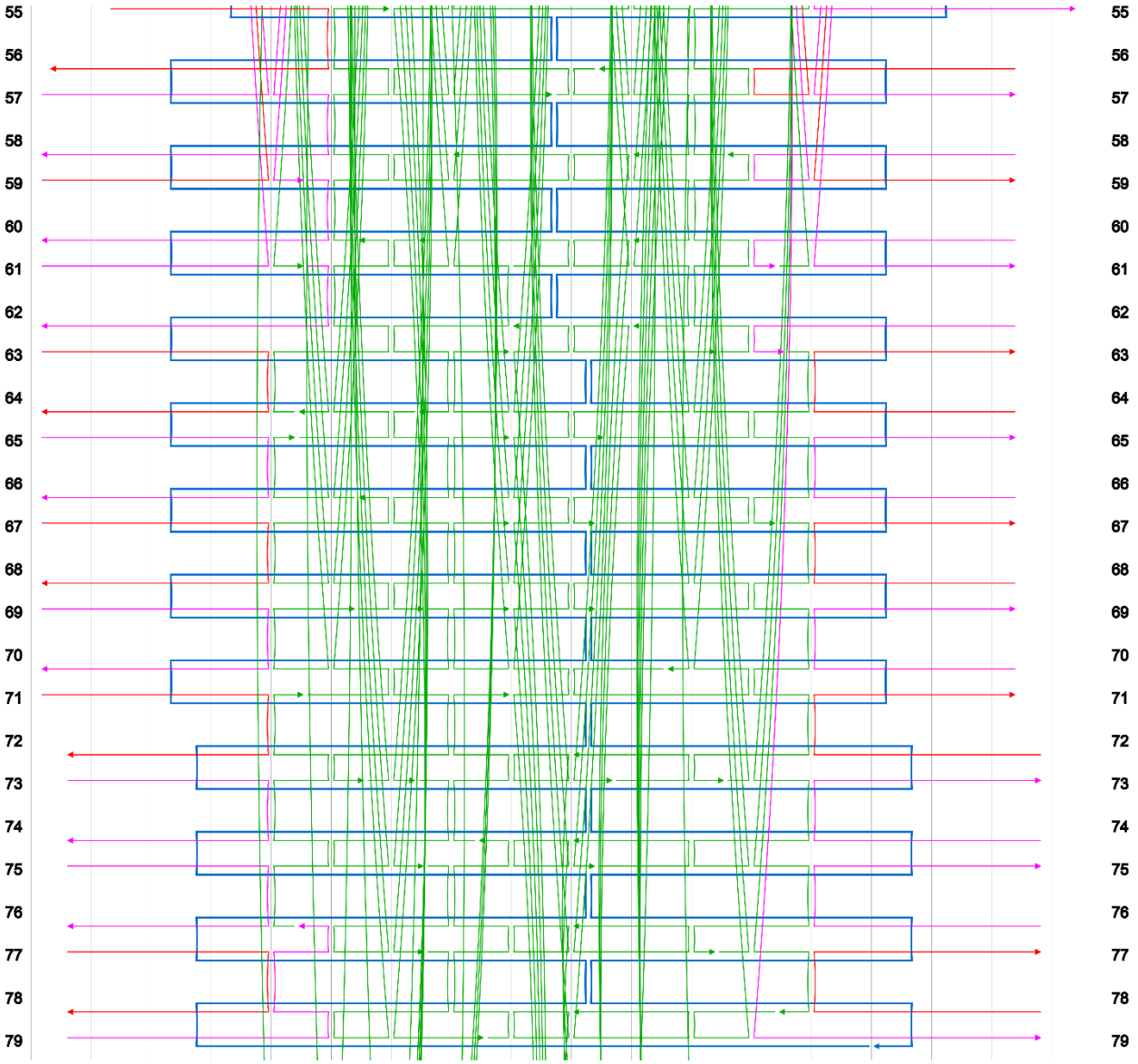

Figure S6. 3D DNA origami cylinder folding map. Scaffold is depicted in blue, core staple strands in green, poly-thymine passivated strands in pink and connector overhangs in red (16 connectors per side).

Table S1. Sequences of core staples in cylinders. Names denote both the function of the staple strand and its position according to the line numbers in Figure S5: [function- 5' position – 3' position].

Name	Core staples 5'→3'
core-2-42	GTG CGG AGT GTG TCA TAC AAA AGG TCA GAG GC
core-69-73	CCC ATA GCT GGA AGC ATG CTA ACT CAC ATT AGG GA
core-61-60	ATT CTC CGA GAA CGC CAT CAA AAA T
core-29-69	TAT TTT AAT AAA TTA CCT TGT GAA AAG GTC GAC TC
core-65-21	GGA AAC CAG GCG ATC GCA TCC
core-26-66	GTT CTG CTC AAC GAC GGA GGG GGA TGT GCT GTC GG
core-77-37	TGA AAT CAA AAG AAT AGG AAC AAG ATT CAT TAA ACG AGC AAA GCG AAG
core-20-65	TAC GGT AAG AAA AGT AAC GAC AAC TCG TAG AGC GA

core-58-19	ATT TAA ACT CAT TTT GCC ACT ATC TTT GAC CCC CAG C
core-31-69	CCC TAC ATT CAT CAT CAG CGT TGG GAA CTG GCC ATG GTC CGG GTA C
core-69-24	TAG ATT GTA AAT TCA GTG AGA ACC G
core-42-39	GAT GTC TGG AAA TGC TGA AGA GGT
core-5-38	CAG AAG TAA GCA CTG GTA CTA A
core-42-6	ATA TAA CTT TCG CAC ATA GTT TCT GTA TGG TCA GAG CCA CCA TTG G
core-54-52	AGC ATC AAC CGT TAT TCA TTA AAG GGG GAA TTA AT
core-76-71	GGT TCT TTT CGC GTA TTT CCA GTC ATT GCG TCA AC
core-21-16	GCG AAG TAC AAA ACA CTC ACG AAG GTC ATG AGC GA
core-61-23	TTC CCC GAG GAG CCG AAC AAT AGC TTA AG
core-37-1	GCT TCA ATC AAT AAC TCA TCG TT
core-56-17	ATT TAG ATT TGT TTA CCT ATA AAA G
core-60-55	GTC AAA TCA GTT GTA AAA GAA AAG ATC GTA ACA TTG CC
core-46-11	GTA GTA GCA ATA AAA ATA ATT TAT CG
core-32-1	GAT ATA GCG TGA GAA GGG AAT AGG
core-1-32	AAT GCT GAG ACT CCT CAA CCA GGC TTA TCC GGT GA
core-2-38	TAA ACA CCG TAC TCA GGG GAT AGC AAG CGA ACC AA
core-17-57	AAA CGG GCA AGG CGA AAG ACA GCA ACA GGA AGA TT
core-73-72	AGT CTT TAA CCA GCA GAA GAT GG
core-30-75	ACC CGT TTA CCA TCA AGA TTA GTT GCG TCT TTC CAG AGC CT
core-52-10	CAA TCG TCG CTA TTA ATT ATA GCT TCG ACA GAC GT
core-70-26	CAG CAA ATG ATG GAA AAC AGA GGT GAG GCG GTT GAG AGC AAA TAG CGA A
core-15-13	CAT AAA GAA GAT TAC ATT TAA CAA GTA CAT AAG AG
core-71-26	ATA CGA GCC GTT TCC TGT ATG CGA GGC TTG AGA TG
core-4-44	CTT TAA ATC CTC ATT AAG GCA GGT GTA GGG CTA TGC GT
core-63-67	TTA CTT TAC ACA TTT GAT AGG AGC TGA
core-49-45	CAT AGG TCT GGG GTT ATG AAA ACT TGA CCT AAT AA
core-1-79	CCC GAT TAG GAT TAG CGG AAT GTT TCA TAA ATA GTC CAC TAT T
core-78-36	GCT CAT GGA AAG GGC GAC AAG CAA AGC CGT TGT AC
core-66-64	TGC TGT ACA GTA AGG GAA CCG AAC GTC GAA ACT CC
core-25-65	CGA GTC ATC AAG AGT AAT GCA TAG GGT TGG GAC ATT CGC
core-67-73	GGA ATC AAT CAT TGC TGA GCC ACG CCA GTA TTT ACC GAA CGA ACC ATG CG
core-18-62	GGC AAG AAC TGG CAT GAT AAT AAC GCG GAA TCG GAA CA
core-14-54	CCG TCA CGC ATA ACC GAT TCA CCC TCA GCA CGA TAA TGC CGG
core-49-46	GCC TTT AAT AGT GAA ATG CTG AAT CGC AAA AAT ACC GAC CGT A
core-33-4	TAA GGT TTT GGG TTG ATC CAC CCT GAG CCA CCT GA
core-6-42	CCT TGA TAC TAA ATA AAG CCA ACG AGC CAG TAA TAA CC

core-34-78	TAG AAA GAC TCC AAC GTC AAA TAC CTA CAT TTG G
core-60-24	AAT TAA CAA CGA AAC AAC CTG CTC TCA ATC AAC CAG GCC TT
core-19-58	GAT AAA ATA AAA TAC GTA ATT TAA CCA ATA GTT TGG TAT AAG CAA AT
core-38-2	AGC GAA CCA GCG GAT GGC TTA TTT ATC AAC TGT AGA ATG ATA CAC CGT A
core-20-15	CAA TTA AGA CAA ATA CAA AAG ACA AGA AAA TGC GA
core-44-9	GTC AAT ATT CTA CTT TTT GCT GAA TTG CGA TAT TAG C
core-45-40	ACA AGT ATC ATT AAT TGA TTT AGG AAA GTA ATC AG
core-23-28	AGC TAA TAT CAC AAA GTA AAC AGG AGC CTT TCA AA
core-5-40	ACA AAT TCC AAT AGG AAC CTT GAG AAT ATA AAG TGG AGC TTA ATT GC
core-24-69	GAG ATA ACC CAC AAG ACT AAA ATT AAC TGA ACG TCA GTT GGC AAC CGA A
core-36-40	CGC ATC GGC TAC GAG CAA ATA GAT ATG CAG A
core-64-69	GAA AAA GCG CAG GGC GAC AAG GCG CAC GAC GGG AT
core-27-67	TTA TAC CAG AAC GAG TAG CTT GCC CTC CCA GTA TTA AGT
core-50-54	GCG AAT TTT CGG AAA CAT TTC ATT CAA T
core-21-64	GCC CCT ATA CCA AGC GCC CGT CGG GGA ACA AAC GGC GGT GCA TCT TCA G
core-75-74	CTG GCC AAC AGT TTT GAA TGG CTA A
core-73-75	AAC ATC TAC GAC AGG TAG AAA GAT ACT AAT GAG AC
core-65-20	GCC GTC AAT AGA TAA TAA ACA ATT GCA GAT AAA CG
core-10-13	AGC GAT CAA GTC ATT AGC GCA A
core-67-22	TCA ACA GTT GAA AGG AAT ACT AAC ACC AAT AAA TC
core-9-44	GTT TGG AAC CGC CAC CCG AAA TGT GAT AAA TAA ATT CTT ACC AGT TG
core-28-73	GGA TTG AGA TTT AGC CTA ATT TGC TTT TTT GTT TAA CAT GAT T
core-6-46	CGA CCC TCA GAG CCG CCA GCC GCC AAT AAG AAA TTT AA
core-17-60	AAA CGC TAC ATA ATG AAT AAA TCC TGA
core-13-49	CCA AAG GCC GGA AAC GTT CAG TAG AGA TTA AAA AT
core-63-58	GAA CCA TTT TGT ATC ATC CAA TAT ATG GAA GGG TA
core-51-56	AAT ATA TGT GAA AAT TAA TGA TGA TTT GAA TAA CAA TAA CGG
core-30-78	CGA GCT ATT TTG CAC CCC TTG CGG ATG GAT TAA AC
core-32-76	AGC CTT AAA GAT CTG ACG CTC AAT CTA AAA GGG ACA TTT
core-51-10	TTG CTT CAG AAG AGT AGC AGC TCA T
core-7-37	TTT AGC GTA ACA TTC CAC GTA ACA CAC CCT CAG CAA ACC AAA TAT
core-16-53	GGG TCT TTT GCA TTT TTG TAT TCA A
core-24-73	GAC AAA TAA GGT AAA TTG TTT TAA GAA GAA AAC TG
core-12-49	AAT TTC TTA GGA GCC TAA TTT TTG TAA TAC
core-10-49	AGC CCC CTA TGC ATC CAT GCA ACT CAG AGC AGG AGA A
core-11-51	GTT TAT CGA TCA TTT CAA CGC AAG TGT AGG TAA AGC C

core-40-5	TGA ATA TAG TTT CAC ATG TAC CAG ACA GCC TTC ACA A
core-79-74	AAA CCT TAT ATG GTG GTT GGC CCT CAA CAG CAC GC
core-26-70	GCG CAT TAG ACG GGA GAC ACC GTC AAA AAT GAC AG
core-57-17	CGC GAG AGA ATC GAT GAA CGG TAC CCC AAA ATC GGA AGA AGT TTC CAT T
core-77-2	TGA AGA GGT TTT ATT CTA TAA GAG GCC CCC TGA CA
core-1-37	TGT ATC AGA TTT ACC CTG ACT TAA TTC GA
core-28-30	TAA ACT GAT AGG CAC AGA CAA TAT AGA TAG ACT AA
core-69-24	AAA ATC TAA AGC ATC ACC ATA TCT GAC CCT GAA GA
core-73-31	TCG TGG GAG AGG CGG TTT ACC AGT GCA GAT ACG AGC AAC
core-29-77	AAA ATA AAC CAA CGA CCC TTC CAC ACG ACC AGT AAG TC
core-10-5	TTT CTC AAA ATC CCT CAG ACC AGA AAG GTT GAA GC
core-11-7	TTG TTT TCA CAC TAA AGA AAC AAC TGA A
core-75-33	GGG GAG AGA GTT GCA GCA AAA TCC CGA GAG GAT AG
core-22-67	TTA CCG AAG CCC TTT TAA ACA TTG AGT TAA GCA CTA ATA GAT TAT GCG A
core-12-52	TCA GCT TGC TTT CGA ACC ATC GCC CAC CAA ATT CAA
core-34-34	GCG AAA AAT CAG GTC GAA CAA GCA ATC AGA TA
core-15-58	AAG GTC ATA TGT CAG GTT AGA AAT A
core-8-48	TCA CCA TCT TTT CAT AAA TCG GCA AAC GCG AAT AAC TA
core-52-52	AAG GGT AGC TGA TAA ATT CAA GAA AAC AGT G
core-23-63	CTG CGA GGC GCA GAC GGC ATG TTA ATC GGC CGC CAG TT
core-10-15	TCG GAC CGT AAC ACC AAT GCC ATT TTG AAT TAC AA
core-46-42	TAA CGC ATC AAA CCT GTT AGA TAC AAG TT
core-64-60	AGC GCG CAT CGT AAC CGA TTG ACC GAG CGA GTC GC
core-54-14	AGA GCT GGA GCA AAC ACC TGA TTG CAA CAA ACC CAA AGA TCA
core-34-29	TCC CGG GGG TAC TTT TGC ATA GTA AAT AAC GCC AT
core-74-71	GCG GCC AGC TTG AGT GAA AAG TGT
core-58-54	AAA CTA ACG TCC GGG AGA ACC AAG TTA CAA AAC TG
core-100-23	GAT TGT GAT TGT GAT TGT TTT TTT TTT TGG GTA ACG CAA CTC TGG
core-87-34	GAT TGT GAT TGT GAT TGT TTT TTT TTT CAA AAT CGA ACG TGT ACT
core-101-8	GAT TGT GAT TGT GAT TGT TTT TTT TTT TAT ACA AGG CGT TAA CCC
core-86-2	GAT TGT GAT TGT GAT TGT TTT TTT TTT CAT TTT TGA CCG GAA TTT TCA GAG GTT T
core-94-14	GAT TGT GAT TGT GAT TGT TTT TTT TTT TGA GAG TGG TAG CTG GGA TCG ATA TTC G
core-81-28	GAT TGT GAT TGT GAT TGT TTT TTT TTT TGC CTA AGC ATT AAG TCA
core-88-46	GAT TGT GAT TGT GAT TGT TTT TTT TTT TTT TGC GTA AAG CTA ATT AAG CAT
core-95-63	GAT TGT GAT TGT GAT TGT TTT TTT TTT AAG AAA CAC TTA AAT CCT TTG CCC
core-83-30	ATT ACT GCA AGT GCA AAT TTT TTT TTT TCG GCC ATG ATT GCG AAT

core-98-25	ATT ACT GCA AGT GCA AAT TTT TTT TTT CGA GCT CAG GGT TTT GA
core-90-11	ATT ACT GCA AGT GCA AAT TTT TTT TTT GAG TAA TGG ATA AAT TAA
core-103-10	ATT ACT GCA AGT GCA AAT TTT TTT TTT TGG TTT GGA CAA AGT TT
core-97-4	ATT ACT GCA AGT GCA AAT TTT TTT TTT ACG CGC CTA CCG ACA TGG
core-104-62	ATT ACT GCA AGT GCA AAT TTT TTT TTT TGA GGG GCA CCG TG
core-91-18	ATT ACT GCA AGT GCA AAT TTT TTT TTT AAG AAA TAT ACT TCA GGT
core-82-31	ATT ACT GCA AGT GCA AAT TTT TTT TTT ATA AAT CGA ATC GTA GAC TGG AAA AAC CTA A
core-105-51	CAG TAT CAG TAT CAG TAT TTT TTT TTT TAT GTA ATT TAT CAG ACG CTG TGT A
core-96-27	CAG TAT CAG TAT CAG TAT TTT TTT TTT AAA GCC TTC GTA ATT CA
core-93-20	CAG TAT CAG TAT CAG TAT TTT TTT TTT TTG TTT GAG AAG GAG GAA
core-85-32	CAG TAT CAG TAT CAG TAT TTT TTT TTT CAC CGC CTC CGA AAC GAC
core-102-21	CAG TAT CAG TAT CAG TAT TTT TTT TTT CAT TCA GCG ACA GTC TTA
core-99-6	CAG TAT CAG TAT CAG TAT TTT TTT TTT ATT TTC GCT CAA CAC AGA
core-92-12	CAG TAT CAG TAT CAG TAT TTT TTT TTT CCG TTC TGA GAA AGT GAC AAC AGG TG
core-84-1	CAG TAT CAG TAT CAG TAT TTT TTT TTT CGC GTT TAT TAT AGT AG
core-122-77	TGG ACT TAT ACT TGG ACT TAT TTT TTT TTT ACT ATC AAA AAT AGT GTT
core-113-35	TGG ACT TAT ACT TGG ACT TAT TTT TTT TTT AGT ACC GAT AAG TAT CAG AAG AAT GAC C
core-109-65	TGG ACT TAT ACT TGG ACT TAT TTT TTT TTT GAT ATT CTG AAC GGG GGC CTC GCC
core-110-45	TGG ACT TAT ACT TGG ACT TAT TTT TTT TTT TAG TAA ATT TCA ACA AAG
core-108-61	TGG ACT TAT ACT TGG ACT TAT TTT TTT TTT ACA CTA ACG GAG ATT AAA
core-111-51	TGG ACT TAT ACT TGG ACT TAT TTT TTT TTT GTC GCT GCC GAC AAG CCG GAG AAT GCC T
core-52-107	AAT GAC TTG AGA AAC CAT TTT TTT TTG TAC ACA TCA TTG TAA TC
core-73-106	CGA GAA ACG ACA GTT ACT TTT TTT TTG TAC ACA TCA TTG TAA TC

Table S2. Sequences of poly-thymine (pT) passivated strands in cylinders. Names denote both the function of the staple strand and its position according to the line numbers in Figure S5: [function- 5' position – 3' position].

Name	Poly-thymine passivated strands 5'→3'
pT-21-22	TTT TTT TTT TTT TTT CTG ATA AAT TGT TGA CCA ACT TTG TTT TTT TTT TTT TTT
pT-37-40	ACT TTC CAA CAT TTT GAT TAG CTC AAC ATG TTT TAA ATT TTT TTT TTT TTT T
pT-45-8	TTT TTT TTT TTT TTT GGC GCG AGC TGA AGT TTC AGC GGA TTT TTT TTT TTT TTT
pT-27-28	TTT TTT TTT TTT TTT TAA TCA TTG TGA AAC GAA CTA TTT TTT TTT TTT TTT
pT-36-1	TTT TTT TTT TTT TTT AGA ACG GGT ATT CGG AAC CTA TTA TTT TTT TTT TTT TTT
pT-11-12	TTT TTT TTT TTT TTT AAG GCT CCA AAA AAC AGC TTG ATA TTT TTT TTT TTT TTT
pT-74-73	TTT TTT TTT TTT TTT GTA AGA ATA CGT GCC CTA AAA CAT TTT TTT TTT TTT TTT
pT-52-51	TTT TTT TTT TTT TTT TTT TTT AAT CCT TAG AAT TTT TTT TTT TTT TTT

pT-79-76	TTT TTT TTT TTT TTT GTG TTG TTC CAG TTT GCC CGA GAG CAG GCG AAG C
pT-38-37	TTT GTC TTT CCT TAT CAT TCC ATT TTT TTT TTT TTT T
pT-6-43	TTT TTT TTT TTT TTT CGC CAG CAT CCA TAT TTA TTT TTT TTT TTT TTT
pT-0-34	TTT TTT TTT TTT TTT TTC TGA AAC ATG AAA GTA TAG AAC GCC CAA
pT-37-36	TTT TTT TTT TTT TTT TTA AGA GGA AGC CCG AGA TT
pT-71-72	TTT TTT TTT TTT TTT CAC AAT TCC ACA TGC GCT CAC TTT TTT TTT TTT TTT
pT-34-33	TTT TTT TTT TTT TTT TCA TTA CCG CGC GAG GCG TTT TAG TTT TTT TTT TTT TTT
pT-56-16	TTT TTT TTT TTT TTT ACA GTA CCT TTT ACA TAG ATG AAA ATC
pT-18-59	TTT TTT TTT TTT TTT TGT TAG CAA CCT ACC ATA TTT TTT TTT TTT TTT
pT-4-5	TCC ATG GAA AGC GCA GTC TTT TTT TTT TTT TTT T
pT-61-20	TTT TTT TTT TTT TTT TTT CAT CAA CAT TTG TAT CAT CGC TTT TTT TTT TTT TTT
pT-7-7	TTT TTT TTT TTT TTT CTT TCC AGA CGT
pT-18-19	AGA TCC TTA TTA CGC AGT ATT TTT TTT TTT TTT T
pT-61-62	TGT GTA ATG GGA TAG GTC ACG TTT TTT TTT TTT TTT T
pT-41-4	TTT TTT TTT TTT TTT TAT GCA ACT AAA TCG TCA CCA GTA TTT TTT TTT TTT TTT
pT-3-38	TTT TTT TTT TTT TTT AGA ACC GCC ATT AGA GAG TTT TTT TTT TTT TTT
pT-17-59	TTT TTT TTT TTT TTT TTG AGG ACT AAA GAC TTT TCA CCA ACT TTT
pT-20-61	TTT TTT TTT TTT TTT AGA AGG AAA TGA TTA TCA TTT TTT TTT TTT TTT
pT-30-29	TTT TTT TTT TTT TTT ATC CTG AAT CTT ACA GCC ATA TTA TTT TTT TTT TTT TTT
pT-16-58	ACG GAT AAT CCG TTA ATA TTT TGT TAA AAT TTT TTT TTT TTT TT
pT-2-36	TTT TTT TTT TTT TTT GGG GTC AGT GCC TTG AGT ACC TAT TTA AAC
pT-51-52	TTT TTT TTT TTT TTT TAT TTT AAA TGC ACA GTC AAA TCA TTT TTT TTT TTT TTT
pT-43-6	TTT TTT TTT TTT TTT TAG ATT TAG TTT AAG TTT TGT CGT TTT TTT TTT TTT TTT
pT-58-18	TTT TTT TTT TTT TTT TCA AAA TTA TTT GCA CGT TAG AAA CGT
pT-39-3	TTT TTT TTT TTT TTT TAC CTT TAA TTG CTC CGG TCA GGA CCC
pT-35-34	TTT TTT TTT TTT TTT CTT TAA ACA GTT CAG AGA A
pT-76-75	TTT TTT TTT TTT TTT AGA TTC ACC AGT TGA CCT GAA AGC TTT TTT TTT TTT TTT
pT-13-14	TTT TTT TTT TTT TTT CCG ATA GTT GCG AGG CTT GCA GGG TTT TTT TTT TTT TTT
pT-49-50	TTT TTT TTT TTT TTT CAT TAT GAC CCT AGA ACC CTC ATA TTT TTT TTT TTT TTT
pT-13-15	AAT ACG GAA AAT TGA GGG AGG GAA GGT TTT TTT TTT TTT TT
pT-10-47	TTT TTT TTT TTT TTT GCG TCA GAC ATA TAT TTT TTT TTT TTT TTT TTT
pT-48-50	TTT TTT TTT TTT TTT ACC TCC GGC TTA GGT TAG AGA CTC ATA
pT-24-23	TTT TTT TTT TTT TTT ATT GAG CGC AAG AAA CAA TTT TTT TTT TTT TTT
pT-63-64	TTT TTT TTT TTT TTT TGG TGT AGA TGG CAG CTT TCC GGC TTT TTT TTT TTT TTT
pT-4-41	TTT TTT TTT TTT TTT CTG AAT TTA CAG ACG ACG TTT TTT TTT TTT TTT
pT-9-47	TTT TTT TTT TTT TTT GTG AGA ATA GAA AGG AAC AGT TGA AAT TAG
pT-36-0	GCA TCG AGA GCT CAG TAC CAG GCG GAT TTT TTT TTT TTT TT

pT-12-11	TTT TTT TTT TTT TTT CAC CAT TAC TTG CCT TTA TTT TTT TTT TTT TTT
pT-31-32	TTT TTT TTT TTT TTT TTA CGA GGC AAA AGA AGT TTT TTT TTT TTT TTT
pT-36-35	CAA TTT ATT TTC ATC GTA GGA ATT TTT TTT TTT TTT T
pT-62-63	TTT TTT TTT TTT TTT GTT TGA GTA ACA TTA TGT TA
pT-25-26	TTT TTT TTT TTT TTT AAC GTA ACA AAG TAA TTT CAA CTT TTT TTT TTT TTT TTT
pT-72-71	TTT TTT TTT TTT TTT CGC CAT TAA AAA AAC ACC GCC TTT TTT TTT TTT TTT
pT-22-21	TTT TTT TTT TTT TTT TGA AAT AGC AAA GTT ACC TTT TTT TTT TTT TTT
pT-3-2	TCA CAG AAC CGC CAC CCT CTT TTT TTT TTT TTT T
pT-68-67	TTT TTT TTT TTT TTT ATC AAA CCC GGT TAT CTA TTT TTT TTT TTT TTT
pT-6-7	CAG GCC ACC ACC AGA GCC GCT TTT TTT TTT TTT TT
pT-8-9	CCT CAC CGG AAC CAG AGC CTT TTT TTT TTT TTT T
pT-16-57	TTT TTT TTT TTT TTT TTT TGT CAC TAT ACA GTA TTT TTT TTT TTT TTT
pT-54-55	TAC TCG CGC AGA GGC GAA TTT TTT TTT TTT TTT T
pT-1-36	TTT TTT TTT TTT TTT TAA GTG CCG TCA AAA AGA TTT TTT TTT TTT TTT
pT-66-65	TTT TTT TTT TTT TTT AAA TAT CTT GGA TTT AGA TTT TTT TTT TTT TTT
pT-57-16	TTT TTT TTT TTT TTT TGT ACC CCG GTT GCT ACA GAG GCT TTT TTT TTT TTT TTT
pT-4-42	GTT GTA CGG TTC CCA ATT CTG CGA ACG AGT TTT TTT TTT TTT TT
pT-55-56	TTT TTT TTT TTT TTA GGC TAT CAG GTA ACT AGC ATG TCA ATC ATA TTT TTT TTT TTT TT
pT-59-18	TTT TTT TTT TTT TTT TTC GCA TTA AAT CTA AAA CGA AAG TTT TTT TTT TTT TTT
pT-64-63	TTT TTT TTT TTT TTT AGT ATT AGA ATT TTA AAA TTT TTT TTT TTT TTT
pT-33-34	TTT TTT TTT TTT TTT TTT GCC AGA CCT CAA ATG TTT TTT TTT TTT TTT
pT-40-4	TTT TTT TTT TTT TTT ACA ATA AAC AAC ATG TTT CTG TCC CGT
pT-15-16	TTT TTT TTT TTT TTT AGT TAA AGG CCG AGC A
pT-8-45	TTT TTT TTT TTT TTT ACC ACC GGA CAT AAT TAC TTT TTT TTT TTT TTT
pT-38-3	TTT TTT TTT TTT TTT TAA TAT CCC ATC ATA AGT TTT AAC TTT TTT TTT TTT TTT
pT-23-24	TTT TTT TTT TTT TTT AAA GAG GAC AGA ATT ACC CAA ATC TTT TTT TTT TTT TTT
pT-47-10	TTT TTT TTT TTT TTT CAA GGC AAA GAA ATC TCC AAA AAA TTT TTT TTT TTT TTT
pT-73-74	TTT TTT TTT TTT TTT TGC CCG CTT GGG CGC CAG TTT TTT TTT TTT TTT
pT-47-48	CAA AAA TCG GTT GTA CCA AAA ATT TTT TTT TTT TTT T
pT-65-66	TTT TTT TTT TTT TTT ACC GCT TCT GGT TTC GCT ATT ACG TTT TTT TTT TTT TTT
pT-50-49	TTT TTT TTT TTT TTT CCT TGA AAA ACC TTT TTA TTT TTT TTT TTT TTT
pT-16-17	AAT CCA CGG AAT AAG TTT ATT TTT TTT TTT TTT T
pT-29-30	TTT TTT TTT TTT TTT ACG GAA CAA CAA AAG GAA TTT TTT TTT TTT TTT
pT-42-6	TTT TTT TTT TTT TTT ACA ACG CCA ACA TGT AAG AAT CGT GA
pT-32-31	TTT TTT TTT TTT TTT CGA ACC TCC CGA AGC TAC AAT TTT TTT TTT TTT TTT TTT
pT-43-44	ATT TAG CTA TAT TTT CAT TTG GTT TTT TTT TTT TTT T
pT-19-19	TTT TTT TTT TTT TTT AGG CAA AAG AAT

pT-5-43	TTT TTT TTT TTT TTT CAA ACT ACA ACG CCT GTA GCG ATC TAG ACC
pT-77-78	TTT TTT TTT TTT TTT TTT GCC CCA TAG GGT TGA TTT TTT TTT TTT TTT
pT-44-8	TTT TTT TTT TTT TTT TAG AAA AAG CCT GTT TCC GGA ATA CCG
pT-34-79	TAG AAA ACC GTC TAT CAA GCC ATT TTT TTT TTT TTT T
pT-46-10	TTT TTT TTT TTT TTT AGT TAA TTT CAT CTT CTT TTC AAT GT
pT-70-69	TTT TTT TTT TTT TTT TGC AAC AGT ACC TCA AAT TTT TTT TTT TTT TTT
pT-40-39	CTA AAG TCC TGA ACA AGA AAA ATT TTT TTT TTT TTT T
pT-54-53	TTT TTT TTT TTT TTT TAT TCA TTT TGA ATT ACC TTT TTT TTT TTT TTT
pT-60-61	TTT TTT TTT TTT TTT GAT GAT GGC AAT TCA TAT A
pT-75-76	TTT TTT TTT TTT TTT GGT GGT TTT CCA CGC TGG TTT TTT TTT TTT TTT
pT-78-77	TTT TTT TTT TTT TTT TTG CAA CAG GAA ATT TAC ATT GGC TTT TTT TTT TTT TTT
pT-53-54	TTT TTT TTT TTT TTT CCA TCA ATA TGA AGA GAT CTA CAA TTT TTT TTT TTT TTT
pT-26-25	TTT TTT TTT TTT TTT ATA ACA TAA CAG AGG GTA TTT TTT TTT TTT TTT
pT-45-46	GTG ATC CAA TAA ATC ATA CAG GTT TTT TTT TTT TTT T
pT-28-27	TTT TTT TTT TTT TTT TTT ATC CCA ATC ACA GAG AGA TTT TTT TTT TTT TTT
pT-59-60	GTT TGG CCT TCC TGT AGC CAG CTT TTT TTT TTT TTT T
pT-69-70	TTT TTT TTT TTT TTT TTG CAT GCC TGC TTG TTA TCC GCT TTT TTT TTT TTT TTT
pT-67-68	TTT TTT TTT TTT TTT CCA GCT GGC GAA CCA GTG CCA AGC TTT TTT TTT TTT TTT
pT-14-13	TTT TTT TTT TTT TTT TAA ATA TTG CAC CAG TAG TTT TTT TTT TTT TTT

Table S3. Sequences of connector overhangs c1. Names denote the position of the connector in the folding map in Figure S5, with the line number being where the overhang protrudes from the origami (here: 5').

Connector overhangs c1	
Name	**Sequence 5'→3'**
c1-72	1 2 3 4 5 GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTT TTT CGCCATTAAAAAAACACCGCC TTT TTT
c1-68	GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTT TTT ATCAAACCCGGTTATCTA TTT TTT
c1-64	GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTT TTTAGTATTAGAATTTTAAAA TTT TTT
c1-40	GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTT TTT ACAATAAACAACATGTTTCTGTCCCGT
c1-44	GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTT TTT TAGAAAAAGCCTGTTTCCGGAATACCG
c1-48	GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTT TTT ACCTCCGGCTTAGGTTAGAGACTCATA
c1-0	GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTT TTT TTCTGAAACATGAAAGTATAGAACGCCCAA

c1-14	GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTT TTT TAAATATTGCACCAGTAG TTT TTT
c1-4	GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTT TTT CTGAATTTACAGACGACG TTT TTT
c1-30	GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTT TTT ATCCTGAATCTTACAGCCATATTA TTT TTT
c1-22	GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTTTTTTGAAATAGCAAAGTTACC TTT TTT
c1-18	GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTTTTTTGTTAGCAACCTACCATA TTT TTT
Cy5-c1-78	Cy5/T GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTT TTT TTG CAA CAG GAA ATT TAC ATT GGC TTT TTT
Cy5-c1-26	Cy5/T GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTT TTT ATA ACA TAA CAG AGG GTA TTT TTT
Cy5-c1-56	Cy5/T GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTT TTT ACA GTA CCT TTT ACA TAG ATG AAA ATC
Cy5-c1-4	Cy5/T GTAGTACTA GATTA GTGTAG TTAGTTAG GTGTAATA TTT TTT CTG AAT TTA CAG ACG ACG TTT TTT

Table S4. Sequences of connector overhangs c1*. Names denote the position of the connector in the folding map in Figure S5, with the line number being where the overhang protrudes from the origami (here: 3').

Connector overhangs c1*	
Name	**Sequence 5'→3'**
c1*-72	TTT TTT CAC AAT TCC ACA TGC GCT CAC TTT TTT TAG CTA C GTATCTTCCAT (9)
c1*-68	TTT TTT CCA GCT GGC GAA CCA GTG CCA AGC TTT TTT TAG CTA C GTATCTTCCAT
c1*-64	TTT TTT TGG TGT AGA TGG CAG CTT TCC GGC TTT TTT TAG CTA C GTATCTTCCAT
c1*-40	ACT TTC CAA CAT TTT GAT TAG CTC AAC ATG TTT TAA A TT TTT TAG CTA C GTATCTTCCAT
c1*-44	ATT TAG CTA TAT TTT CAT TTG G TTT TTT TAG CTA C GTATCTTCCAT
c1*-48	CAA AAA TCG GTT GTA CCA AAA A TTT TTT TAG CTA C GTATCTTCCAT
c1*-56	TTT TTT AGG CTA TCA GGT AAC TAG CAT GTA ATC ATA TTT TTT TAG CTA C GTATCTTCCAT
c1*-78	TTT TTT TTT GCC CCA TAG GGT TGA TTT TTT TAG CTA C GTATCTTCCAT
c1*-0	GCATCGAGAGCTCAGTACCAGGCGGATTTTTTTTAGCTA C GTATCTTCCAT
c1*-14	TTTTTTTTTCCGATAGTTGCGAGGCTTGCAGGGTTTTTTTAGCTA C GTATCTTCCAT
c1*-8	TTTTTTTTTGGCGCGAGCTGAAGTTTCAGCGGATTTTTTTAGCTAC C GTATCTTCCAT
c1*-4	TTTTTTTTTTATGCAACTAAATCGTCACCAGTATTTTTTTAGCTAC C GTATCTTCCAT T
c1*-30	TTTTTTTTTACGGAACAACAAAAGGAATTTTTTTAGCTA C GTATCTTCCAT

c1*-26	TTTTTTTTTAACGTAACAAAGTAATTTCAACTTTTTTTTTAGCTACGTATCTTCCAT
c1*-22	TTTTTTTTTCTGATAAATTGTTGACCAACTTTGTTTTTTTAGCTACGTATCTTCCAT
c1*-18	TTTTTTTTTTTCGCATTAAATCTAAAACGAAAGTTTTTTTAGCTACGTATCTTCCAT

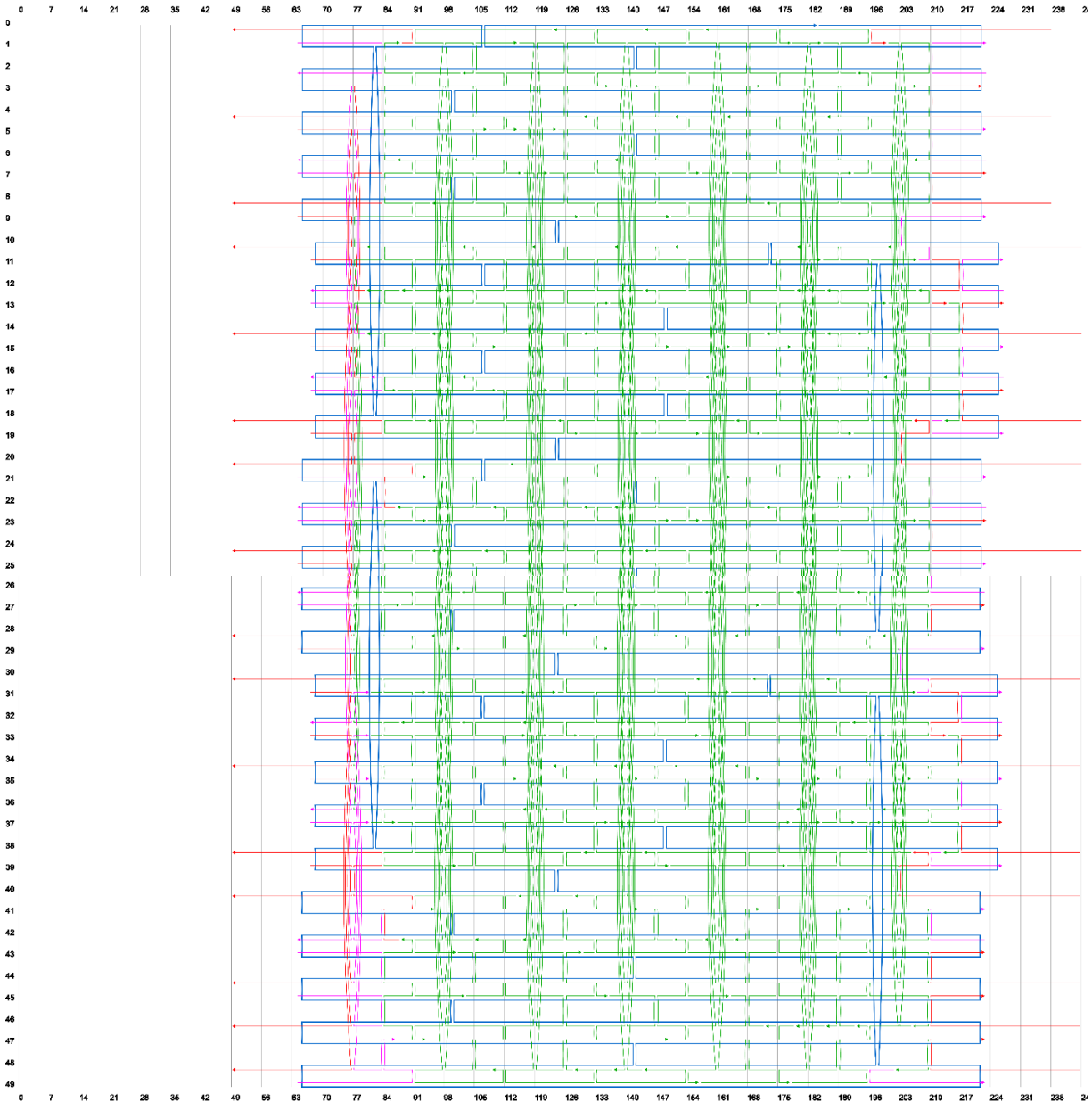

Figure S7. 3D DNA origami nanocuboid folding map. Scaffold is depicted in blue, core staple strands in green, pT passivated strands in pink and connector overhangs in red (16 connectors per side).

Table S5. Sequences of core staples in cuboids. Names denote both the function of the staple strand and its position according to the line numbers in Figure S7: [function- 5' position].

Name	Core staples 5'→3'
Core_0	TTG CTT TGA CGA GCA CGC ACG TAA AAC AGA AAC ATA TCA GAA T
Core_0	GCT ACA GGG CGC AGA GCG GCA ATT CTC ATA TTG AT
Core_0	GCG CCA AAA GAG TTG GTG CAT CGT AGA GAG ATG CA
Core_1	TGA GGA CCG TAA GTT TGA CCG GAG AGG TAA AGT AT
Core_1	TGT TCC AGC AGG CGA AAA CAG TGA GCA TTC GCA AC
Core_1	CAA CGT GGG ATA TCG GCG TTC TAG GAA AGG CTC AT
Core_1	TGC TGA TTG TTC CAG AAG ACA AAA TAC GCA AGA TC
Core_2	GGG ATT TAT CGG CCC GCC AGC TGG CGC AGA AAC
Core_2	CGG TAC GCC AGT CCA TCA TTA AAT CTT TAC AAT TC
Core_2	TGC CCC AGT TTA ACC GTC TAT CAC GCT GCG CGG GT
Core_3	GGT TGT GCG GGA AGT TGG ACC AAA AAA AAT CAT CA
Core_3	TCA CTC CTG TTG AGA TAG TAA CCA CCA CAC CCG CC
Core_3	CCG GAG CCG GAA GCA TAG TGA AAT AAA CGT AGG AT
Core_3	GTA TCG TTG CGC TCA CTG TTA CCG CGA GGA AGG GC
Core_4	GCT TGG GGA GAG GAG GCC TTA GAA TCG TAC TAT GG
Core_4	CCT GGG GTG CCA TGG TCA CCA GTC CAA AAA GAT AG
Core_4	ATT GTG GGC GCA AAT CGG TAT AAA TTT AAT GCG CC
Core_4	TAA CTC ACA ACC GAG CGA TAG ACT TTC TAA CAG
Core_5	GTA ACT TTA GGT CAA TCA CCT CCG GCC TTT TGT AG
Core_5	CTT GCT GTC GTT TAA TGA TAG ACA GTT GTA TAA CG
Core_5	AGA AAC GCT CAT GGA AGA TG
Core_6	TGA CGC TCA TAA TAA ACA GTG CCC GGT CAG TAT
Core_6	TCT AGT AGA ACG TTG TAG AGT CTG AAT CCT GAA CC
Core_6	TGC AAG CGG TGG TTA AAC GCA GCC TAG ACC GGA TA
Core_6	ATA CCG GGG GTG TGG TGC ATC GAC TTC AAA TGC TT
Core_7	CCA GGC TGG TAA TGG GTA GCC ATC CAC GTC AGC GT
Core_7	TAC CCT TAC ACT GGT GTG ATT AGT CTT TAA AAG AA
Core_7	CCG TTC CGG CCG TTT TTA GG
Core_7	ACT CTT TCT GCT TCC TGT AAG TGT AAC AGC TGG TT
Core_7	AGA CCC TTT AGT CCT CAT ATT CGA GAG AAG TTC AAC A

Core_8	TTC TAG ACA ATC GCC ATT AAA AAT AGG TGA GGA CG
Core_8	TGC GCG CAG TGG TTC TTC CGT AAT CTA ATG AGT TT
Core_9	TGC CAA CAT CCT GCA GCC ACA GGA AAA CAA TAC CC
Core_9	TGG TAA GGT TTC CCC TGC CCT CAC ACC CGG GTT TA
Core_10	CAG AAG CGG ACT TGT AGA CAC GCA ACC AGC TTC CC
Core_10	CAG CAG CAA CCG TCG CTG GAT GCT GGT CAG TTG TT
Core_10	ACG AGA ATA CGT GGC ACG GCC AAC CGA CCA GAT CG
Core_10	AAC TGA TAG CCC TAC CGG TCA AAC GCG CAA ACC CAG CAC TAG AAA A
Core_10	GGT GGA GCA CAT GAT GAA TGC CGT GGT GAA GGA TA
Core_10	CTT TAC CCT GAA AAA AGA ATA AAA AAA ACA GCC AG
Core_10	ACA TAT TTT TGA ATG GCT TTC AGC AGG CAT CAA TAC CTA GGC
Core_11	CAT CCT ATT ATG AGG TGT CCA GCA TGT ATG AGT GC
Core_12	CTG AAC CTT GCA GAG CCG ATT AGA CCT TTG CCA TT
Core_12	AAA AAA GCG GAG ACT TCA AAT AGT AAA ATC ACC GGC AT
Core_12	TAA ACC GGT GCC TTT GCT CGT CAT AAA CGG CAG GT
Core_12	CCC GGC GCC TGC CGG GTC ACT GTT GAC GGC TGA GT
Core_12	TGT ACT GCG GCC GGG CGC GGT TGC GCA GCG GGG GT
Core_13	TGC GGA AAC ACG CCA CGG CAC CGC AGA TCG CCC CG
Core_13	CAA ATT CCC ACA ACT AAG AAC TGG GCG ACT GTA GC
Core_13	AAA TTC TGA GAT TGC GGA ACG GAA CTC AAC TAA AA
Core_14	CGC CCC AAG CTA CCA GGC ACG ACA GAC AAA CGT TC
Core_14	TTT ATA GCT GTC AGC ACG CGT GCC TTC ACT GCT AA
Core_14	AAT TGT TGT AAC ATT CAG ATC TGC CAT GGG ATA AA
Core_14	GAT TTG AAC CTT ATA ACT TTT TTC ATA TTT AAA GT
Core_14	ATC TGG CGA TTC CTC TTC ATT ATC AAT CAA TAT TT
Core_15	GGT TGG GAA GGA TGG GCG TAG ATC ATT AAC CAA TA
Core_15	GGG GGA TGT TAA TAC TAG AGT CAT GTT TAT AAA AG
Core_15	GAC GAT TAA GCG CGA GCT ATC AAC GAA CGA GTC AG
Core_15	CGA CTG TGA GAT CGA ATT GCG TCC GTG AGC CTA TC
Core_16	TGT TTT CCC AGG CAT AAA AGC TAT AAT TCA GTG AA
Core_16	CGT ACG CTG CAG CCA GCA AAT TAA CGA ACT CAA TA

Core_16	GAA TTC AGA GGC AAG GCA ATT CTA AAC CGG AGA GA
Core_17	CGG AGC TAT TAA ACG CGC TCC AGT CGG GAA ACC TG
Core_17	CAT GGA TTA TTG CTT TGA ATA CCA TCG CG
Core_17	ATC AGG AAG GGA ACA ATA ACG GAT TGC ACC CAT TA
Core_18	AAT TTT TGC GAA TTT CAA AT
Core_18	CTC GAG TCC AAG CGG TCC ACG CTG ATT GCC CGC CG
Core_18	ATC CTT TCC TCG GAT TAA A
Core_18	TCA CAT AGC CCT GAT GGT GGT TCC GCA GGG TGA AC
Core_19	CTG TAG CCA GCA AAG CCC GTA AAA CAG ACA GCA CT
Core_19	GTT AAA TCA GCT AAA ATT CAA AAG ATT ATC CGA GC
Core_19	TTT TGA TGA TGG GTC CCT CAA AAA GCT AAA CAG GC
Core_19	GGA ATT GTA AAC TGA GAG GAG GAC TAA AGA ATA AT
Core_19	AAT AAT TCG CGT TGT ATA GAG AAT CAG CAA CGA CG
Core_20	CAG AGG TGC TAT TTT CGC CTG ATA CTT CTA AAT TAT GAA
Core_21	GAA CAT TAA TGG GGG ACG AAA GCG CAC GGG CAA AG
Core_21	AAT CCC GAC TTG CCG TTT CCT GAA CGA GTT AAG CC
Core_21	AAT CCA AAA ACA GGA AGA TCT GGC CGC GGA TTT GT
Core_21	GGA GTA TTT TTA CCG TGC GCT GCG CGT TTT TCT GAG C
Core_22	TTA CGT CGA ATT ATT CAT CGA GGC GGG AAT CAG TT
Core_22	GAA AGA ACC CTC GCC TGA CGC AGA CAC CGA AGC AG
Core_22	ACA TAC CTG AGC GCA TTA AAA CAA AAA GTT TTT A
Core_22	TAG CCA AAC AAA GCA AAT ATT TAA ACG CCA TCA GG
Core_23	ATG CTA CAA CGG AAC CGA AGC CCG GTT CGG AAC CT
Core_23	AAA TCT ACA AAT CAT TGC CGT TAA TAT TTT GTT CA
Core_23	AAC CTC ATT CCA TCA ATA AGT TAC CTG ATT AAG AGG T
Core_23	GAC CAT ACA GGT GGA GCA TCG GCG TGT TAT CGG TC
Core_24	TTG TGT AAC GCA GGA ATT CAG GAT CGT TGA GCC AT
Core_24	GGG AGA AGC ACA ATT CAC AAC TAA ACT ATC CAT TT
Core_24	TGT AGC TTA GAT CCT GAA AAG AGA ACC TTA TTA AA
Core_26	CAT TAT TGC TGC TAC GTT CGC CAA AAG AGC CAT AC
Core_26	GTT ACA AAT ATC CTG CAA AGT TAA CAA TCG GGA CA

Core_26	ATT TGC TCA ACC AGG ACG ACC AGA GAC CCT CAC GT
Core_26	CTG CTG GCA TCA AAG AAT AGG GTG ACT GAT AAG GT
Core_27	CTT AGC GAA CCC CGG CCA CTG GTC TGC ACC GTC GG
Core_27	AAC ATA TGT AAG CGA TAA ATC GTC GTG AGT GTT TG
Core_27	ATT TGA CTA CCA TTT ATC ACA TTA TAT TTT TAC AA
Core_27	TGT AAG TTT GAT TGG GGC AAT AAA GAT GTG TAG GG
Core_28	TAA GAT AGC GTT TGC CAT CTT TTC CGG AAC CCT CA
Core_28	TTT AAA CGG AAC GTG CCA AGC CGC ACT CAC GGC GG
Core_28	TCA GAA TAA ACT AAT TAC TAG AAA AGA TCA GTT GAG A
Core_28	TTT AAT AAA TAT TAG TAT CAT ATG CGC TCA ACC AA
Core_28	CAA AGA GCT TAT CGC AAA CCT GTT TGC TAA ATT TT
Core_29	GTT AAA TAA GGA TTA GAG AGT ATA TAT TAA CAA A
Core_29	GCG ATT ACC AGA CGA CGA ACC ACA TAA CAT TAT TC
Core_30	CTA TCA TAA TAC ATA AAA TAA AAA AAG GCT TGC
Core_30	AGT AAG AGT TGC CAG AGG GGG TAA TAT CGT GC
Core_30	ATC AAA ATG TTT AGA CTG GAG GAA GAA ATA TGA TT
Core_31	ATT AAA TCA ACC GGA AAA CCA AAA AGC AAA GTC
Core_31	AAT TAC GAG GAT TGG GAA ACA CCA GTA ACA AAA AC
Core_31	TTG CCA AAG CCA TTT GGG AAT TAG AGC CAG TAT GG
Core_31	AAC GTT ATA CAT ACC GAC CGT GTG GTT AAT TAG AA
Core_31	AGG GTT CAA CCT ATC ACC GTC ACC GAC TTG AGA CA
Core_32	CGC CCA GTA ATC AAG AAA GAA ACC AAA GAA CGC AA
Core_32	GCC AAA CCT TTA ATT GCT CTT AGG TGC TGA GAT TTG C
Core_32	AAA GAT TCA GAT ACC GAC CAA CAA TGT CTC CAT GT
Core_32	TTA TGG GCT TTA TTC ATA ACG GTG TGA CCC CTA AT
Core_33	CCT GCA GTA AGC CAC CAC CAG AGC CCA CCC TCA GG
Core_33	AGC AAC ATG TGA ACG CGT CAT CTT AAA CAG ACC GA
Core_33	GTA ATT ACA GGA TAA GAG CTC CAA CTC GTC TCG CTG CGC G
Core_33	GTT GGT AAT CGG AAT AAG TTT ATT ACC AGC TAG GA
Core_33	TGT CAT GCA GAA ACG AGG TAA ATT GGC CCA ATG TA
Core_33	CTT GTA ATC TAT AGG CTA TAC ACT AAC CTA ACC CT

Core_33	TGG TTA AAG CAG GTC AGA CGA TTG CCT TTA GC
Core_34	GCT ACA GAC GAT TTG ATG CAA TCA ATA CCG CCA CC
Core_34	TAA CCA TAA GGG AGA TTT ATC TTT TTC ATG AGA CA
Core_34	GCT CTT TTC ATC CAT TAG GAT AGC TCA GGC GGG AT
Core_34	CGC CAT AGT GAT TTT TAA ATA TCT GAT TGC CGG GT
Core_35	GAT GTA CCC AAG AAA AGG GAA CGA GGA CGC AGA AT
Core_35	GCG CTG ACA AGC TAA TAG ACA GTT GAC TTA AAT TG
Core_35	CAA TAA CAT GTT AAA TAA TGG TCG GCA ACA GTG GG
Core_35	TAC TAG TAA GCG AGT AAC AGT GCC CAG TGT ACA AA
Core_35	TTT GAG CGC GAC CAT TAA GCT ACA GCG CAT AAC C
Core_35	GTA AAT AAT AAA AAC ATA ATG CTG AAG CAT CGA GC
Core_36	AAG ATA AAA GAC CCT GGC TGC AAA AAA TAT TAT CC
Core_36	CGC GAC CTG CTC ATC GTA TTT TAG CCA ATC CAA ATA AGA TGT T
Core_36	CTT TAC AGA CTA CCA GGG AGA CTC CTC AAG AAT CC
Core_36	ACC AAA AGA GGC GAG AGG ACA TGA AAG TAT TAG AA
Core_37	ACG AAA TAG GAG CCA CCC TCA GAG CTG CTC AGC AG
Core_37	GCA AGC GGG AGA AAC AGC CAT ATT AAT AGC AGT AAC T
Core_37	TAC GCA GCG ATA TTC AAA TAG CAA AGC CAG TGA TG
Core_37	GCC ATC GGA ACG CTG AGG CTT GCA TCC AAA AAC AA
Core_37	GAA GGT ATT AAA TAT ATG CTA TTA TAG AAG TTC AA
Core_37	AAG CAT TCC ACA TAG CTA TCA CCG TAC TCA GGA CA
Core_37	GGT AAC ACT GAA GAA CCG CCA CCC TGT GCC GTA CA
Core_38	GAA TAG CAT GTT CAA CCC TCA GGA TTC TGG TTT CA
Core_38	AGG CAG TCA GGG GCT AAT CCT GAT TGC GAT CGT GC
Core_38	TTC TGA TAC CGA TAG TTG GAA TTT CTT TTC TGT AT
Core_39	GAC AAC AAC CAT TAT CAG AAA CAA CTT TCA ACC AC
Core_39	GAT ATG GAG CCT GCG GAG TGA GAA TAT ACC GTA AAA
Core_39	ATC CGA ACC TCA AGA TTA ATT TAA CGA ACA AAA CT
Core_40	CAG CTT TTT AAC GAT TAA GAA CGT TCA ATT CAA GAA AGA G
Core_40	TAA TTC CAG ACG TTA GTC CTC ATA TTA CCG CTG TCG
Core_41	GGG ACT GTA GCA AAT CAG GTA TCA TCA TAT ATC GG

Core_41	TTC ATT AAT TGT ATC GGT TCG CCC AAG GCT TTT CT
Core_41	AGG AAA AAG GCT CCA AAA ATT CGG TCG AGG GTG AT
Core_41	GAA CGT TTT GTC GTC TCG TCA AAA ATG AAA TTT
Core_41	CTA AAG GAA TCA AGC CCA GGC ACC AAA ACA CCG GA
Core_42	CAG TGA AGT TTA ACA AAG CTG AGT ACC TCA GAT CA
Core_42	CTA AAA CTT ATT TTT TCC TTA TTG CCT TTA TTT CAT AA
Core_42	AGC GGC AAG AAA CAA TGA TAA GAA ATA GCC GGA CG
Core_42	ACG CTT TTG CTC TTG CTT TCG AGG TCG CCG ACA GA
Core_42	AAC TAG GTT TAG TAC CGC TAA GTA TAC TGA CCG CT
Core_43	GCA AGA CAG CAA ATG AAT TAA A
Core_43	CAA TCG AAC AAA TCG GCT AGA TAA GTT AAG ACT GG
Core_45	TTA ATG CCC CCC ATG GCT CGA CAA TCG AAC TAT GG
Core_45	CAG TGC CTT AGA TAG CAA TAA GAT AAC GAT
Core_45	ATT AAC CGT TCA CGA GAA GAA AAA TAA TAT AAC GT
Core_46	AAT GAG AGG CTC GGA TAA CAG AAC CAC CCA TGG AA
Core_46	TCA TTT AAT TAT TTT AAA GTA CGG TTG AAT CCC CC
Core_46	TCT CGC ATT GAC AGG AGG AGC CGC CCC ACC ACA TA
Core_46	AGC GAG TAA ATT ACC AGT ATG TTT TCC CGA AAT TG
Core_46	ATT TTT CTG AAG TTG ATA CAC CCT CGT TTC GTA GT
Core_47	AGA ACG TCA TAT GCC TAT AAT AGG TGT ATC TTG GT
Core_47	ATA TAC GCA GTA CTG GCA AGA AGG AAA GAA TTA AA
Core_47	AGA AAC GCA AAG GCG ACA CTT AAT TAG CCT GTA GGC
Core_48	AAA GGA CAC CAA AGT TTT AAC GGC TTA TAA AGA TC
Core_48	AGG AAT GCA GAC CCT CGT GAG GCT TTT GCA AAC TT
Core_48	TTT TTG TCA ATA CAG GGT ATA AAC CCT TTT AAT A
Core_48	TTC ACA AAA TCA CCA GTA GCA CCA TCC ACC CTC AG
Core_49	CAC CAA TGA AAC CAT CGA CCC TCA GTT GAG GCC AG
Core_49	CAT TAG CAA GGC CGG AAA GAA CCG CGC CGC CAT GA

Table S6. Sequences of pT passivated strands in cuboids. Names denote both the function of the staple strand and its position according to the line numbers in Figure S7: [position of protruding end_function_line number].

Name	pT passivated strands 5'→3'
Left_pT_0	TAC TAA AGA AAT TGC GTA GAT TTT CAG GTT TTT TTT TT
Left_pT_2	TTT TTT TTT TTA ACG TCA GAT GAA TAA GAG AAG TGT TTT TAT AAT CAT TTT TTT TT
Left_pT_4	ACG TAG TAA AAG CAA TAC TTC TTT GAT TAG TTT TTT TTT
Left_pT_6	TAG TTG CCT GGA AAT GGA TTA TTT ACA TTT TTT TTT TT
Left_pT_8	CAG AGT CAC AAG AGA TAG AAC CCT TCT GAT TTT TTT TT
Left_pT_10	TTT TTT TTT CCT GAA AGC GTA AAC CAC CAG TTT TTT TTT
Left_pT_12	TTT TTT TTT GGC AGA TTC ACC CAG CAA ATG TTT TTT TTT
Left_pT_14	TTT TTT TTT TAA TAA CAT CAC ATA ATA CAT TTT TTT TTT
Left_pT_16	TTT TTT TTT AAC GCT AAC GAG CGT CTT TTA CCT TTG AGT AAC CGA
Left_pT_16	TTT TTT TTT GTG AGG CCA CCG TAT TAA TTT TTT TTT TTT
Left_pT_18	AAT TGA AGC CGC TAC AAT TTT ATC CGG GAG ATT TAC AGT AAC AGT ACT TTT TTT TT
Left_pT_20	TTT TTT TTT CTT TTA CAT CTG AAT CTT ACC TTT TTT TTT
Left_pT_22	TTT TTT TTT TAA AAG TTT TTT AAT GGA AAC TTT TTT TTT
Left_pT_24	TTT TTT TTT TTG AGG ATT ATT AAT TTT CCC TTT TTT TTT
Left_pT_26	TTT TTT TTT AAA AAT CTA ATG CAA ATC CAA TTT TTT TTT
Left_pT_28	TTT TTT TTT CAG AAG ATA CTG ACC TAA ATT TTT TTT TTT
Left_pT_30	TTT TTT TTT TAA TGG TTT GAA AAA TTC TTA TTT TTT TTT
Left_pT_31	TTT TTT TTT ATA CAT ACA TAA AGG TGG CGG AGG GAA GCC
Left_pT_32	TTT TTT TTT TCG CAA GAC AAA AAT TTA GGC TTT TTT TTT
Left_pT_33	TTT TTT TTT TAA CGG AAT ACC CAA AAG AAT GTT AGT TCG
Left_pT_34	TTT TTT TTT TTA GAA TCC TTG TCC CAT CCT TTT TTT TTT
Left_pT_35	TTT TTT TTT TAT CAG AGA GAT AAC CCA CAA CCG AGG CAT
Left_pT_36	TTT TTT TTT AGT ACA TAA ATC AAC CAA GTA TTT TTT TTT
Left_pT_37	TTT TTT TTT CAG GGA AGC GCA TTA GAC GGA GGG TAT CGA
Left_pT_38	GTC AGG AGA ATC CTT TAC AGA GAG AAC AAA ATG TTT CCA GAG CCT AAT TTT TTT TTT
Left_pT_40	TTT TTT TTT TTG CCA GTT ATA ACA TAA AAA TTT TTT TTT
Left_pT_42	TTT TTT TTT CCG CAC TCA ATT GAG CGC TAA TTT TTT TTT

Left_pT_44	TTT TTT TTT AAT TTA CGA GAA ACG CAA TAA TTT TTT TTT
Left_pT_46	TTT TTT TTT AGA GGC ATT CAA ACG TAG AAA TTT TTT TTT
Left_pT_47	TTT TTT TTT ACG GAA ATT ATT CAT TAA AGG TGA ATG ATT GAG AAC
Left_pT_48	TTT TTT TTT CCA GTA TAA AGG TAA ATA TTG TTT TTT TTT
Right_pT_0	TTT TTT TTT GTG GAC TCC AAC GTC AAA GGG CGA AAG GAA
Right_pT_2	TTT TTT TTT AGA GTT GCA GCA CTA TTA AAG AAC TTT TTT TTT
Right_pT_4	TTT TTT TTT CAC ACA ACA TAC CCT GGC CCT GAG TTT TTT TTT
Right_pT_6	TTT TTT TTT GGC CGT TTT CAC CGC TCA CAA TTC TTT TTT TTT
Right_pT_8	TTT TTT TTT CAC TCA ATC CGC CAG AAT GCG GCG TTT TTT TTT
Right_pT_10	TTT TTT TTT GAA TGA CCA TAA ATC AAC AGT TCT GGG CGG TTT C
Right_pT_11	TAA AAA ATC AGT CAT TGC AGG CGC TTT CGT TTT TTT TT
Right_pT_12	TTT TTT TTT GCC AGC AGT AGA AAA CGA TTT TTT TTT
Right_pT_14	TTT TTT TTT AAC CTC ACC TCA TTT GCC TTT TTT TTT
Right_pT_16	TTT TTT TTT AGC TTT CCG GGA ACG GAT TTT TTT TTT
Right_pT_18	TTT TTT TTT GAG TAA CAA ACT CCA GCC TTT TTT TTT
Right_pT_18	TCG AAC ATT AAA TGT GAG CTT TTT TTT T
Right_pT_20	TTT TTT TTT ACC CCG GTT GAT AAT CAG ATT TCA TCG ATT
Right_pT_22	TTT TTT TTT ATC AAT ATG ATA TCA ATC ATA TGT TTT TTT TTT
Right_pT_24	TTT TTT TTT CAT CCA ATA AAT AGT CAA ATC ACC TTT TTT TTT
Right_pT_26	TTT TTT TTT TCA TTC CAT ATA TAG TAG CAT TAA TTT TTT TTT
Right_pT_28	TTT TTT TTT CAT AAA TAT TCA TGT CTG GAA GTT TTT TTT TTT
Right_pT_30	TTT TTT TTT CGG TCA TAG CCC CCT TTT TTC ATT TAT GCG TCA A
Right_pT_31	GCG ATT AGC GTC CAA TAC TGC GGA ATC GTT TTT TTT TT
Right_pT_32	TTT TTT TTT TGA ATT ACC CGG CAT TTT TTT TTT TTT
Right_pT_34	TTT TTT TTT TCA TCA AGA TAA TCA TTG TTT TTT TTT
Right_pT_36	TTT TTT TTT GGC AAA AGA GGC TGA CCT TTT TTT TTT
Right_pT_38	TTT TTT TTT GGA TCG TCA AAC GAA AGA TTT TTT TTT
Right_pT_38	CAG AAA GGC CGC TTT TGC GTT TTT TTT T
Right_pT_40	TTT TTT TTT TTT TTT CAC GTT GAA AAT CGG GAG TTC AGC
Right_pT_42	TTT TTT TTT TTT CAG GGA TAG TGC GAA TAA TAA TTT TTT TTT
Right_pT_44	TTT TTT TTT TTA GCG GGG TTT CAC CAC CCT CAT TTT TTT TTT

Right_pT_46	TTT TTT TTT ACA AAC AAA TAA GAA GGA TTA GGA TTT TTT TTT
Right_pT_48	GTC ACT TAG CAG CAC CGT AAT CAG TAG CGA CAT TTT TTT TT
Right_pT_48	TTT TTT TTT GAA TCA AGT TTG GCC TTG ATA TTC TTT TTT TTT

Table S7. Sequences of connector overhangs c2. Names denote the position of the connector in the folding map in Figure S7, with the line number being where the overhang protrudes from the origami (here: 3').

Connector overhangs c2	
Name	**Sequence 5'→3'**
c2-0	6 3 4 7 10 TACTAAAGAAATTGCGTAGATTTTCAGGT TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG
c2-8	CAGAGTCACAAGAGATAGAACCCTTCTGA TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG
c2-18	AATTGAAGCCGCTACAATTTTATCCGGGAGATTTACAGTAACAGTAC TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG
c2-14	TTT TAATAACATCACATAATACAT TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG
c2-10	TTT CCTGAAAGCGTAAACCACCAG TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG
c2-28	TTT CAGAAGATACTGACCTAAATT TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG
c2-38	GTCAGGAGAATCCTTTACAGAGAGAACAAAATGTTTCCAGAGCCTAAT TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG
c2-34	TTT TTAGAATCCTTGTCCCATCCT TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG
c2-30	TTT TAATGGTTTGAAAAATTCTTA TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG
c2-40	TTT TTGCCAGTTATAACATAAAAA TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG
c2-46	TTT AGAGGCATTCAAACGTAGAAA TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG
c2-48	TTT CCAGTATAAAGGTAAATATTG TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG
c2-4-Cy3	ACGTAGTAAAAGCAATACTTCTTTGATTAG TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG T/Cy3
c2-44-Cy3	TTT AATTTACGAGAAACGCAATAA TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG T/Cy3
c2-20-Cy3	TTT CTTTTACATCTGAATCTTACC TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG T/Cy3
c2-24-Cy3	TTT TTGAGGATTATTAATTTTCCC TTT GTAT GTGTAG TTAGTTAG TGAA AGAGTTG T/Cy3

Table S8. Sequences of connector overhangs c2*. Names denote the position of the connector in the folding map in Figure S7, with the line number being where the overhang protrudes from the origami (here: 5').

Connector overhangs c2*	
Name	**Sequence 5'→3'**
c2*-0	TCCGAACAAT CC AAC TTT GTGGACTCCAACGTCAAAGGGCGAAAGGAA
c2*-4	TCCGAACAAT CC AAC TTT CACACAACATACCCTGGCCCTGAG TTT
c2*-8	TCCGAACAAT CC AAC TTT CACTCAATCCGCCAGAATGCGGCG TTT
c2*-18	TCCGAACAAT CC AAC TTT GAGTAACAAACTCCAGCC TTT
c2*-14	TCCGAACAAT CC AAC TTT AACCTCACCTCATTTGCC TTT
c2*-10	TCCGAACAAT CC AAC TTT GAATGACCATAAATCAACAGTTCTGGGCGGTTTC
c2*-20	TCCGAACAAT CC AAC TTT ACCCCGGTTGATAATCAGATTTCATCGATT
c2*-24	TCCGAACAAT CC AAC TTT CATCCAATAAATAGTCAAATCACC TTT
c2*-28	TCCGAACAAT CC AAC TTT CATAAATATTCATGTCTGGAAGTT TTT
c2*-38	TCCGAACAAT CC AAC TTT GGATCGTCAAACGAAAGA TTT
c2*-34	TCCGAACAAT CC AAC TTT TCATCAAGATAATCATTG TTT
c2*-30	TCCGAACAAT CC AAC TTT CGGTCATAGCCCCCTTTTTTCATTTATGCGTCAA
c2*-40	TCCGAACAAT CC AAC TTT TTTTTTCACGTTGAAAATCGGGAGTTCAGC
c2*-44	TCCGAACAAT CC AAC TTT TTAGCGGGGTTTCACCACCCTCAT TTT
c2*-46	TCCGAACAAT CC AAC TTT ACAAACAAATAAGAAGGATTAGGA TTT
c2*-48	TCCGAACAAT CC AAC TTT GAATCAAGTTTGGCCTTGATATTC TTT

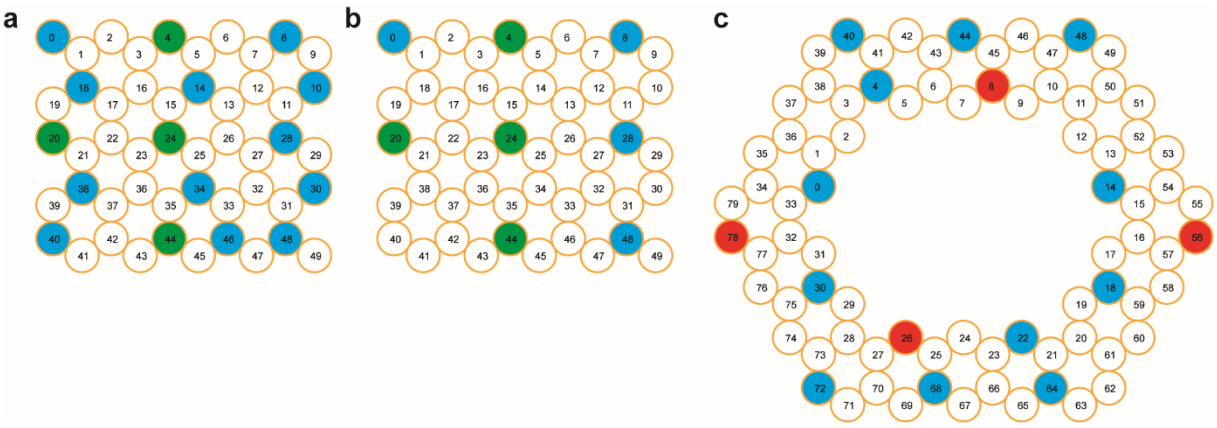

Figure S8. Connector strand positions in the origami. **(a)** Connector strand positions for cuboids with 16 connectors. **(b)** Connector strand positions for cuboids with 8 connectors. **(c)** Connector strand positions for cylinders with 16 connectors. Unmodified connector strands are marked in blue, Cy3 modified connectors in green and Cy5 modified connectors in red.

Table S9. Sequences of free ssDNA strands for the negative feedback loop.

DNA circuit strands	
Name	**Sequence 5'→3'**
Input	5* 4* 3* 2* 9* TATTACAC CTAACTAA CTACAC TAATC ATGGAAGATAC
Activator-IB	8* 7* 4* 3* 6* 2* 1* ATTGTTCGGA TTCA CTAACTAA CTACAC ATACTTAC TAATC TAGTACTAC /3IAbRQSp/
IB-Inhibitor-IB	10* 7* 5* 4* 3* 2* 1* /5IAbRQ/CAACTCT TTCA TATTACAC CTAACTAA CTACAC TAATC TAGTACTAC /3IAbRQSp/
Fuel A	8* 10* 7* 4* 3* ATTGTTCGGA CAACTCT TTCA CTAACTAA CTACAC
Fuel B	10* 7* 4* 3* CAACTCT TTCA CTAACTAA CTACAC
Threshold	6 3 11 3* GTAAGTAT GTGTAG TCTTCT CTACAC