## **Supplementary Information for:**

## Design and Characterization of 1D Nanotubes and 2D Periodic

## Arrays Self-Assembled From DNA Multi-Helix Bundles

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This supplementary information contains the sequences of the molecules used in this work (figures S1 - S3) and histograms of the contour length of the different kinds of DNA nanotubes (figure S4).





**Figure S1** Schematic Drawings of Motifs with Sequences for 1D Arrays. DNA duplexes are indicated by Roman numerals; Oligonucleotide strands are indicated by different colors and strand numbering is shown. The arrows represent the polarity of each strand:  $5' \rightarrow 3'$ . Both ends of each DNA duplex in the systems contain sticky ends. Sticky ends on the same DNA duplex are complementary to each other. Points X and Y are the places where the cyclic bundle closes. Fluorescein molecules are attached to 5'-end of one oligonucleotide strand (indicated by red arrow) and to thymines, which are in purple and larger font size. (A) 6HB (staggered). (B) 6HB+2 (staggered). (C) 6HB+3 (staggered). Sticky ends on the inner six DNA duplexes in (A), (B) and (C) are at different Z positions (top panel in Figure 6B). (D) 6HB+2 (parallel). Sticky ends on the inner six DNA duplexes in (D) are at the same Z position (bottom panel in Figure 6B). All sticky ends in this design are 5' overhangs with six nucleotides in length.





**Figure S2** Schematic Drawings of 6HB+2 with Sequences for 2D Arrays. DNA duplexes are indicated by Roman numerals; Oligonucleotide strands are indicated by different colors and strand numbering is indicated. The arrows represent the polarity of each strand:  $5' \rightarrow 3'$ . (A) Double Cohesion. Sticky ends in this design are 5' overhangs with four nucleotides in length. (B) Single Cohesion. Sticky ends in this design are 5' overhangs with six nucleotides in length. Sticky ends A and A' are complementary to each other, so are the rest.



**Figure S3** Schematic Drawing of 6HB+3 with Sequences for 2D Arrays. DNA duplexes are indicated by Roman numerals; Oligonucleotide strands are indicated by different colors and strand numbering is indicated. The arrows represent the polarity of each strand:  $5' \rightarrow 3'$ . Sticky ends in this design are 5' overhangs with four nucleotides in length. Sticky ends A and A' are complementary to each other, so are the rest.



**Figure S4**. Contour Length Histograms of Staggered DNA Nanotubes. Histograms are derived from AFM data from several fields of view. The mean contour length and the number of counts are indicated for each panel.