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## Molecular engineering of chiral colloidal liquid crystals using DNA origami

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### Supplementary Movies:

#### Supplementary Movie 1

Twisted ribbon assembled from fluorescently labeled s-6h origami filaments exhibits significant thermal fluctuations. Scale bar, 4  $\mu\text{m}$ .

#### Supplementary Movie 2

Thermal fluctuations of a twisted ribbon self-assembled from fluorescently labeled Litmus viruses. Scale bar, 4  $\mu\text{m}$ .

#### Supplementary Movie 3

A fluorescently labeled *fd-wt* bacteriophage-based twisted ribbon undergoes thermal fluctuations. Scale bar, 4  $\mu\text{m}$ .

#### Supplementary Movie 4

Twisted ribbon comprised of fluorescently labeled M13KO7 bacteriophages undergoes thermal fluctuations. Scale bar, 4  $\mu\text{m}$ .

**Supplementary Movie 5**

Force-extension experiment performed on s-6h DNA origami-based twisted ribbon via optical trap. Two rigid dumbbells are used as handles to create torque free boundary conditions. One end of the ribbon is stretched with an optical trap while the force exerted on the other end is measured. Scale bar, 2  $\mu\text{m}$ .

**Supplementary Movie 6**

Force-relaxation experiment performed on s-6h DNA origami-based twisted ribbon via optical trap. Two rigid dumbbells are used as handles to create torque free boundary conditions. One end of stretched twisted ribbon is released from the optical trap while the force exerted on the other end is measured. Scale bar, 2  $\mu\text{m}$ .

**Supplementary Movie 7**

Temperature-induced transition of *fd-wt* twisted ribbon into a 2D colloidal membrane. Scale bar, 2  $\mu\text{m}$ .

**Supplementary Movie 8**

A polymorphic transition of 1D twisted ribbon comprised of s-6h DNA origami filaments into 2D colloidal membrane that nucleates at the end of a freely fluctuating twisted ribbon. The transition is induced by exposing to green excitation light. Ethidium-bromide is the marker for fluorescently labeled DNA origami filaments. Scale bar, 2  $\mu\text{m}$ .