Actuation of complex shape. Can we understand by dimension reduction?

Salient feature to low energy deformations of nematic sheets:

\[(\nabla' y)^T \nabla' y = r^{-1/3} (I_{2 \times 2} + (r - 1)n_0' \otimes n_0') =: \ell_{n_0}' \text{ a.e. on } \omega\]

A richness to shape changing actuation

- Nonisometric Origami and lifted surfaces amenable to actuation:

- Actuating origami experimentally:

Source: Experiments in collaboration with group of Tim White at AFRL