Movie 1: Formation of walls and defects in the low friction regimes for extensile systems. $+1/2$ defects are depicted in blue, and $-1/2$ defects in black. The colour-bar represents the magnitude of the nematic order.

Movie 2: Formation of walls and defects in the low friction regimes for contractile systems. $+1/2$ defects are depicted in blue, and $-1/2$ defects in black. The colour-bar represents the magnitude of the nematic order.

Movie 3: Trails left by defects for $\bar{\Gamma} = 1.87$. Since friction is small, trails stay in the system just for a short while and the passage of defects that move in different directions destroys them. $+1/2$ defects are depicted in blue, and $-1/2$ defects in black. The colour-bar represents the magnitude of the nematic order.

Movie 4: Defect formation in the intermediate friction regime. $+1/2$ defects are depicted in blue, and $-1/2$ defects in black. The colour-bar represents the magnitude of the nematic order. Creation events are marked by red circles.

Movie 5: A newly created defect in the intermediate friction regime is marked by a red circle. The movie shows that in an active system, the defect rotates to align with old defects. $+1/2$ defects are depicted in blue, and $-1/2$ defects in black. The colour-bar represents the magnitude of the nematic order.

Movie 6: Starting from the initial condition of Movie 5 but without activity shows that the elastic interaction between arches and defects does not lead to rotation of defects. This shows that activity plays an important role in the polar ordering of defects and that the presence of arches in a passive system is not sufficient to give polar ordering. $+1/2$ defects are depicted in blue, and $-1/2$ defects in black. The colour-bar represents the magnitude of the nematic order and the red circle shows the newly created defect.

Movie 7: Re-formation of arches by the passage of $+1/2$ defects in extensile systems. $+1/2$ defects are depicted in blue, and $-1/2$ defects in black. The colour-bar represents the magnitude of the nematic order.

Movie 8: Re-formation of arches by the passage of $+1/2$ defects in contractile systems. $+1/2$ defects are depicted in blue, and $-1/2$ defects in black. The colour-bar represents the magnitude of the nematic order.

Movie 9: Evolution of arches towards equal width. The colour-bar represents the magnitude of the nematic order.

Movie 10: Walls that appear in the phase diagram close to the boundary of the instability to active turbulence for small initial noise (see Fig. 5 (a)). The colour-bar represents the magnitude of the nematic order.