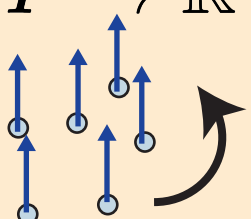
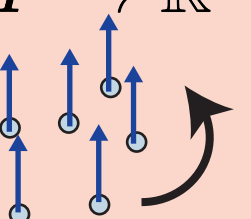
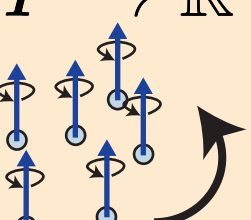
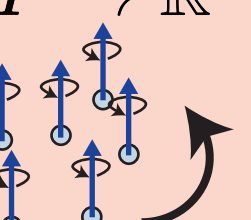
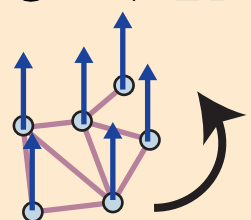
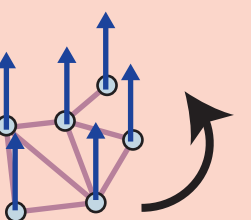
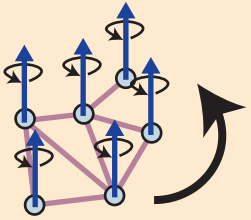
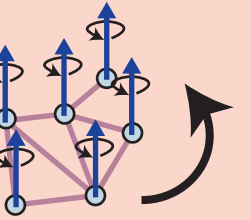
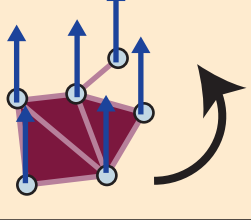
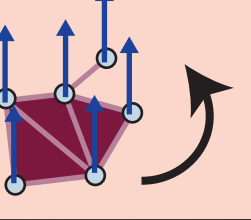
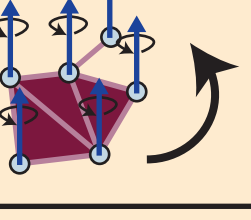
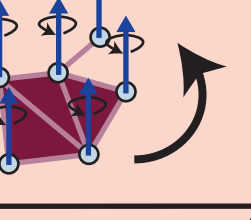
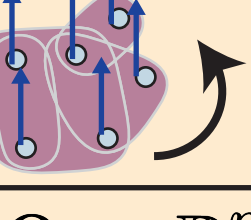
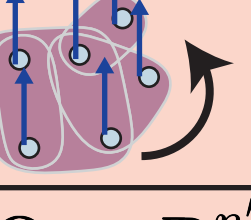
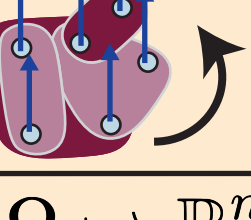
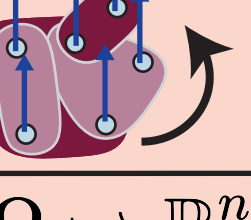
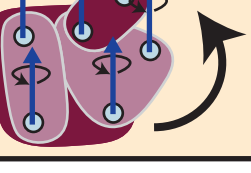
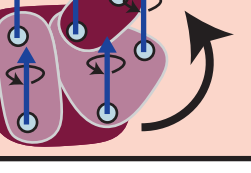


Topology in Neural Network Layers

	Layer Input	Layer Output	Layer Model
1	$x : P \rightarrow \mathbb{R}^n$ 	$y : P \rightarrow \mathbb{R}^{n'}$ 	PointNet++ [Qi17] DeepSets [Zaheer17]
2	$x : P \rightarrow \mathbb{R}^n$ 	$y : P \rightarrow \mathbb{R}^{n'}$ 	Tensor Field Networks [Thomas18] PONITA [Bekkers24]
3	$x : G \mapsto \mathbb{R}^n$ 	$y : G \mapsto \mathbb{R}^{n'}$ 	Graph convolution [Kipf17] Message passing [Gilmer17]
4	$x : G \mapsto \mathbb{R}^n$ 	$y : G \mapsto \mathbb{R}^{n'}$ 	E(n)-EGNN [Satorras2021]
5	$x : \Omega \mapsto \mathbb{R}^n$ 	$y : \Omega \mapsto \mathbb{R}^{n'}$ 	Simplicial and cellular convolution [Ebli20, Roddenberry22] Simplicial and cellular message-passing [Bodnar21, Hajij20]
6	$x : \Omega \mapsto \mathbb{R}^n$ 	$y : \Omega \mapsto \mathbb{R}^{n'}$ 	E(n)-EMPSN [Eijkelboom2023] Clifford-EMPSN [Liu2024]
7	$x : \Omega \mapsto \mathbb{R}^n$ 	$y : \Omega \mapsto \mathbb{R}^{n'}$ 	Hypergraph convolution [Arya20] Message passing [Heydari22]
8	$x : \Omega \mapsto \mathbb{R}^n$ 	$y : \Omega \mapsto \mathbb{R}^{n'}$ 	Combinatorial convolution [Hajij22] Message passing [Hajij22]
9	$x : \Omega \mapsto \mathbb{R}^n$ 	$y : \Omega \mapsto \mathbb{R}^{n'}$ 	E(n)-Equivariant TNN [Battiloro24]