One of the most remarkable examples of self-organized structure formation is the development of a complex organism from a single fertilized egg. With the identification of many molecules that participate in this process, attention has now turned to capturing the physical principles that govern the emergence of biological form. What are the physical laws that govern the dynamics and the formation of structure in living matter? Much of the force generation that drives morphogenesis stems from the actomyosin cortical layer inside cells. We combine theory and experiment, and investigate how the actomyosin cell cortex self contracts, reshapes and deforms, and how these physical activities of actomyosin couple to regulatory biochemical pathways. A particular focus of the talk will be active torque generation by actomyosin and its role in left-right symmetry breaking in early C. elegans development, and a dynamic instability of cortical condensates and its role in controlling autocatalytic F-actin nucleation during the activation of the first cortical actin meshwork in the C. elegans oocyte.