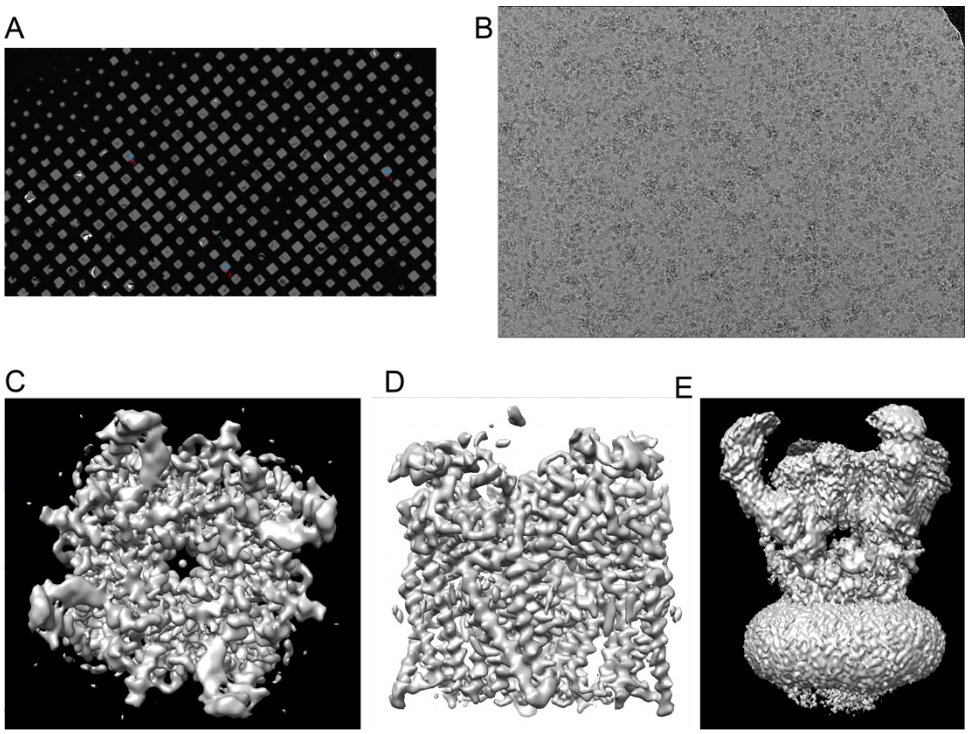
Our original proposal focuses on elucidating structures of the human PKD2l2 channel that plays essential roles in reproductive biology and metabolism. Recently, our collaborator Karl Lechtreck at the University of Georgia showed that a PKD2L2-like channel also exists in alga where the channel regulates velocity of swimming and mating behavior. A notable feature that sets alga PKD2L2-like channel apart from its mammalian homolog is that it bears an unusually large extracellular domain. This domain is believed to function as an antenna that responds to environment stimuli (e.g., hydrodynamic of water). We recently obtained a 4-angstrom structure of alga PKD2L2-like channel and seek to improve the resolution to ~ 3 angstrom, so we can resolve the its extracellular antennae in atomic detail for better mechanistic understanding of stimuli detection by PKD2L2. Our preliminary data are shown in the figure below.




**Structural Characterization of a PKD2L2-like channel in alga.** A) an atlas of an alga PKD2L2-like channel grid. B) a representative of micrograph of alga PKD2L2-like channel. C-E) a 4-angstrom map of alga PKD2L2-like channel viewed from inside the cell (C), or from the membrane (D and E). Note, when the map is examined at low threshold (E), the large antennae-like extracellular domain is viable. The belt-shaped density represents detergent micelle that surrounds the transmembrane domain with a total of 24 helices (see panel D).