Goal
The project aims to purify a BAR protein to generate a membrane complex suitable for structure determination by cryoEM. The sample screening process will provide insight into the influence of lipids on the recruitment of the protein to the membrane.

Background
Cells must be able to change their shape and the composition of proteins in the membrane. The necessary processes at the membrane require the coordination of membrane curvature and actin dynamics; e.g. endocytosis or the formation of transient structures like lamellipodia and filopodia. Although lamellipodia and filopodia are similar, because both are curved membranous structures that contain filamentous actin, the protein machinery that produces them is different. In brief, lamellopodia are broad membrane protrusions that contain a branched actin mesh; whereas filopodia are tubular structures with bundled, linear actin filaments. One protein family that emerged as the link between membrane and actin dynamics are proteins of the Bin1/amphipysin/rvs (BAR) domain family. Therefore BAR proteins are important in cancer or neurodegenerative diseases have

Project description
Peripheral proteins, like BAR proteins, are soluble proteins that bind to membranes. BAR proteins change their conformation upon binding to the membrane. Many of the BAR protein's functions in cells can be tested and investigated in reconstituted systems. Therefore the focus of the project is to find the appropriate expression system, and purification strategy for a BAR protein. We aim to generate the full length protein as well as single domains. BAR proteins can be challenging proteins due to their ability to embed in membranes. However, we have a long experience in purifying them. We will use synthetic lipids to generate the substrate for the BAR protein to generate protein decorated membrane structures. The lab has access to transmission electron microscopes and a long track record of imaging these samples once they are generated.

The prospective candidate should have experience in protein purification/lab work.

Please contact me if you have specific questions.

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