

Master project at Dept of Cell Biology, Wenner-Grens Institute, Stockholm University

Computational 3D image analysis of the actin filament structure

Actin is present in all eukaryotic cells where it plays essential functions as a principal force-generating component in major processes such as intracellular trafficking, mitosis, cell adhesion and migration. Together with myosin, actin filaments operate in such processes in all cells and in muscle tissue these filaments are delicately organized with myosin and other proteins into the sarcomere units where actomyosin contractions take place to power muscle work. Despite its instrumental importance and large efforts in many laboratories round the world it is still not fully clear how individual actin molecules are organized in the filament. We are now announcing a master project (initially for one semester) aiming for an *in silico* analysis of the actin filament structure where new insights concerning the structure of this important protein polymer are to be considered in the light of previous observations.

We believe that a perfect background for someone wishing to work with this project is a combination of biochemistry, structure biology, bioinformatics and/or computational 3D visualization. This project will be mainly computational (but our lab hosts biochemistry and imaging facilities as well). We will combine existing 3D data from protein crystallography and electron microscopy to build models of actin filaments. During the modeling we have to consider protein flexibility and conformational changes caused by complex formation as well as determine the likelihood for different conformations in the filamentous protein complex. A highly motivated student will have the possibility to influence the computational workflow and to work with several software tools.

Interested candidates, please contact: Prof. Roger Karlsson, (roger.karlsson@wgi.su.se) and/or Dr. Linda Sandblad (linda.sandblad@ki.se)