Stratum corneum (SC), a sophisticated outermost skin layer, consists of lipid bilayers and keratin-filled corneocytes or dead cells in a ‘brick and mortar’ structure configuration. The lipid bilayer and keratin-filled corneocytes act as a skin barrier and control hydration and different mechanical properties including lubrication and friction of the skin. It is reported that different bodywash products which contain surfactant can alter the skin properties during and after wash. Although the different skin properties seemed to be affected by surfactant significantly, it is challenging to study surfactant/stratum corneum interaction in vivo or ex vivo at the molecular level due to skin-to-skin variation and technical limitation of analytical instrument and no adequate skin model to study the interaction currently exists.

The goals of WISE are
(1) to develop a permeable, swellable and stable stratum corneum substitute (SCS) using keratin-conjugated liposomes consisting of stratum corneum (SC) lipids,
(2) to investigate actual mechanism behind the alteration of skin properties due to surfactant interactions using various analytical tools.

The advisor will provide basic principles in soft materials and various analytical technique. The candidate is required to have solid background in chemistry.