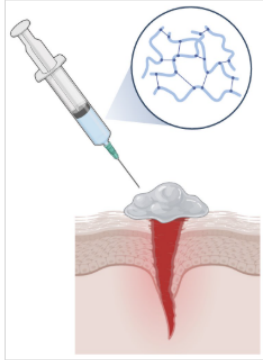


# Soft Matter Product Design Lab

Prof. Samiul Amin

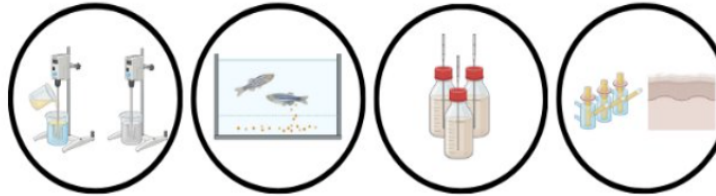


## Smart and Sustainable Drug delivery Hydrogels & Gels



Smart gels & hydrogels in a variety of formats (injectables, patches, sheets, gel-serums etc) are designed to respond to stimuli such as light, heat, pH or ionic strength and release therapeutic agents in a controlled manner to the target site for wound healing, anti-aging, photoprotective, and many other applications

## Design of Sustainable, High Performance, and low Eco-Toxicity Sunscreens

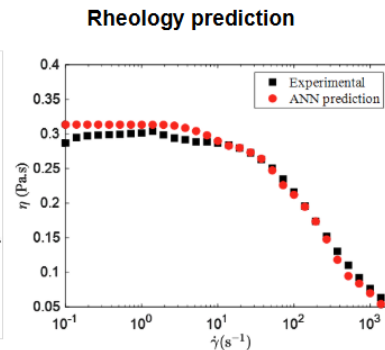
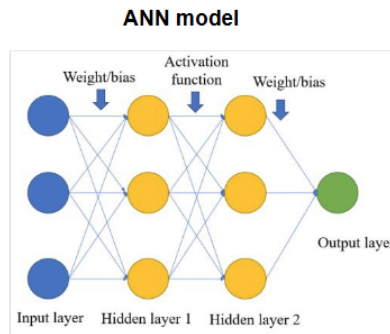


- Formulate photoprotective emulsions using low molecular weight biosurfactants with desirable stability, UV protection, and rheology
- Test sustainable formulations to determine lower levels of aquatic ecotoxicity
- Understand formulation biodegradability and influence on the skin

## Industry Collaborations

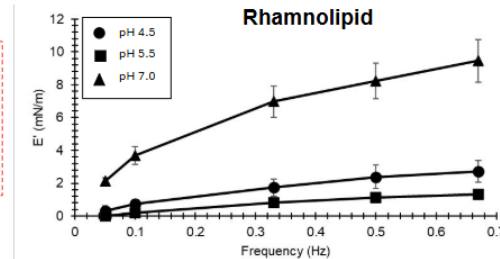
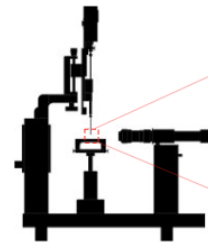


## Machine Learning Guided Formulation Processing



- Machine learning models predict important physicochemical properties of formulations.
- This reduces experimental costs and accelerate formulation development.
- Protein Aggregation in Biotherapeutics: Characterizing Monoclonal Antibody Formulations for Machine Learning-Driven Predictions

## Mechanistic Understanding of Biosurfactant Self Assembly, Interactions, and Surface Activity



- Using optical ~~tensiometry~~ to evaluate biosurfactants' effects in binary and ternary on surface tension and surface rheology
- Determining how biosurfactant systems influence the foam production and stability
- Derive deep understanding to create a toolbox for formulations containing biosurfactants