Develop strong transparent materials for soft tissue replacement (e.g., corneal implants)

Approach: Form Interpenetrating Network Polymer Hydrogel (IPN)

1st polymer network is poly(ethylene glycol)(PEG)
2nd polymer network is poly(acrylic acid)(PAA)

Goal:
- Relate nanoscale structure of hydrogels to macroscopic properties
- Design new hydrogels with desired macroscopic properties

Small Angle X-ray and Neutron Scattering: PEG 4.6K:PAA IPN at pH 7.4

- Broad shoulder at low-\(q\) (\(\xi \approx 4\) nm) mostly due to PEG (left plot) but partly due to PAA (right plot)
- High-\(q\) shoulder due to local (short range) PAA correlations

Details: see Myung et al. Polymer, 2007, 48, 5376-87