



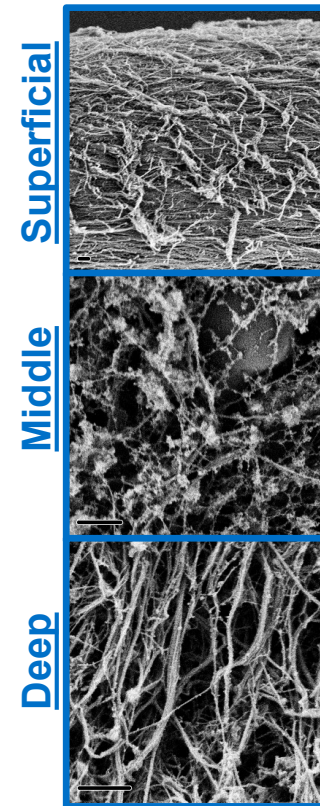
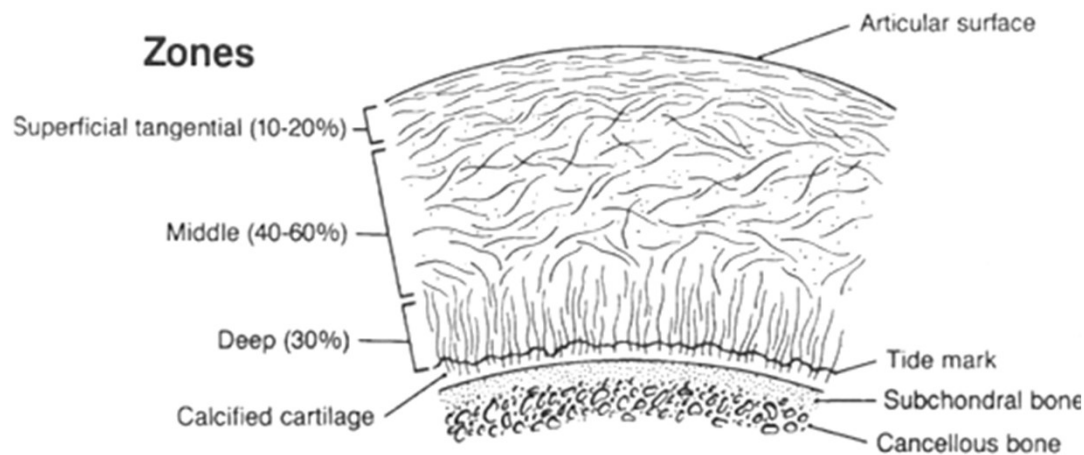
HOSPITAL
FOR
**SPECIAL
SURGERY**

Recapitulating Articular Cartilage Fiber Alignment in Tissue Engineered Constructs

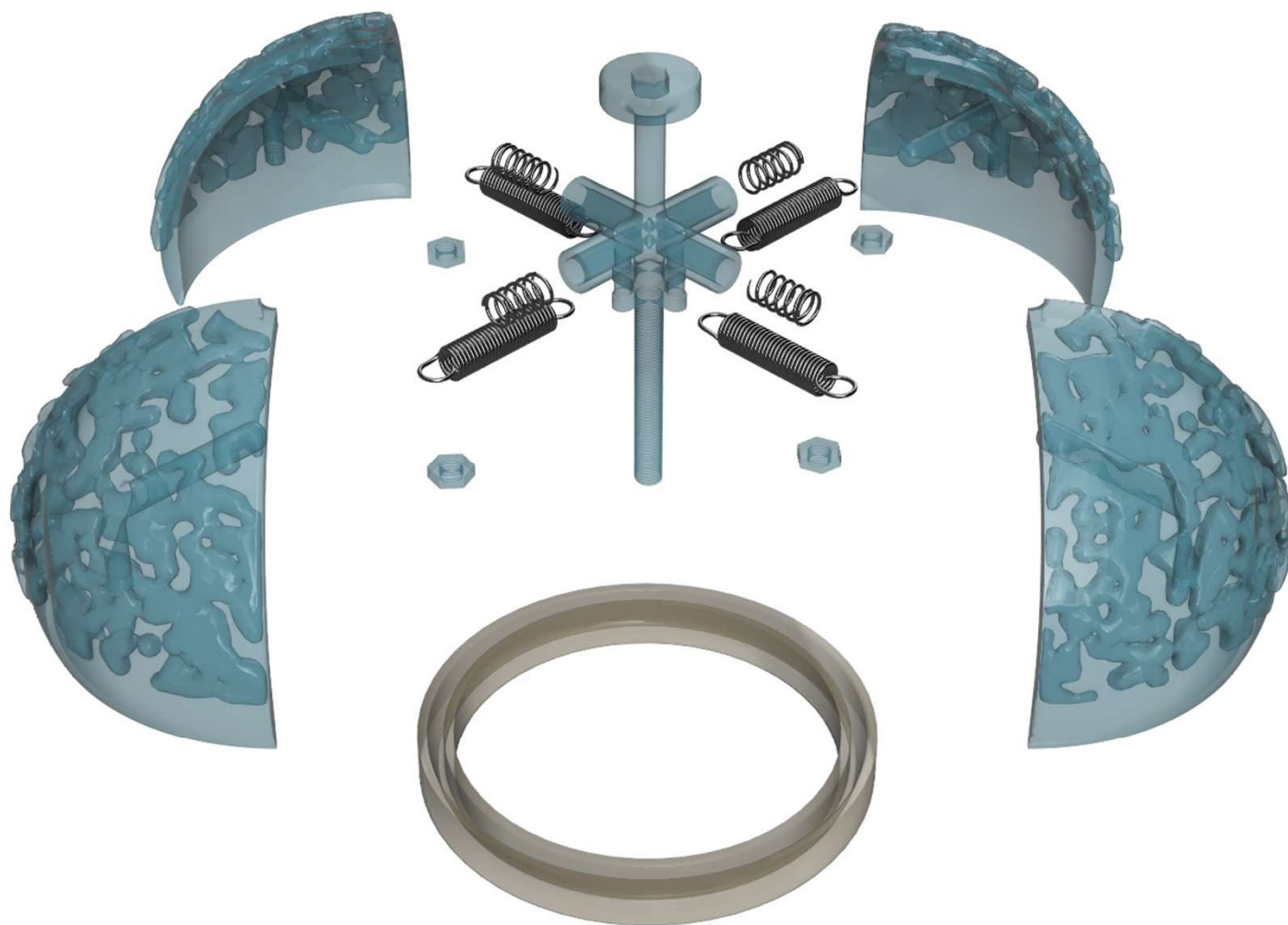
Tony Chen
April 28, 2020

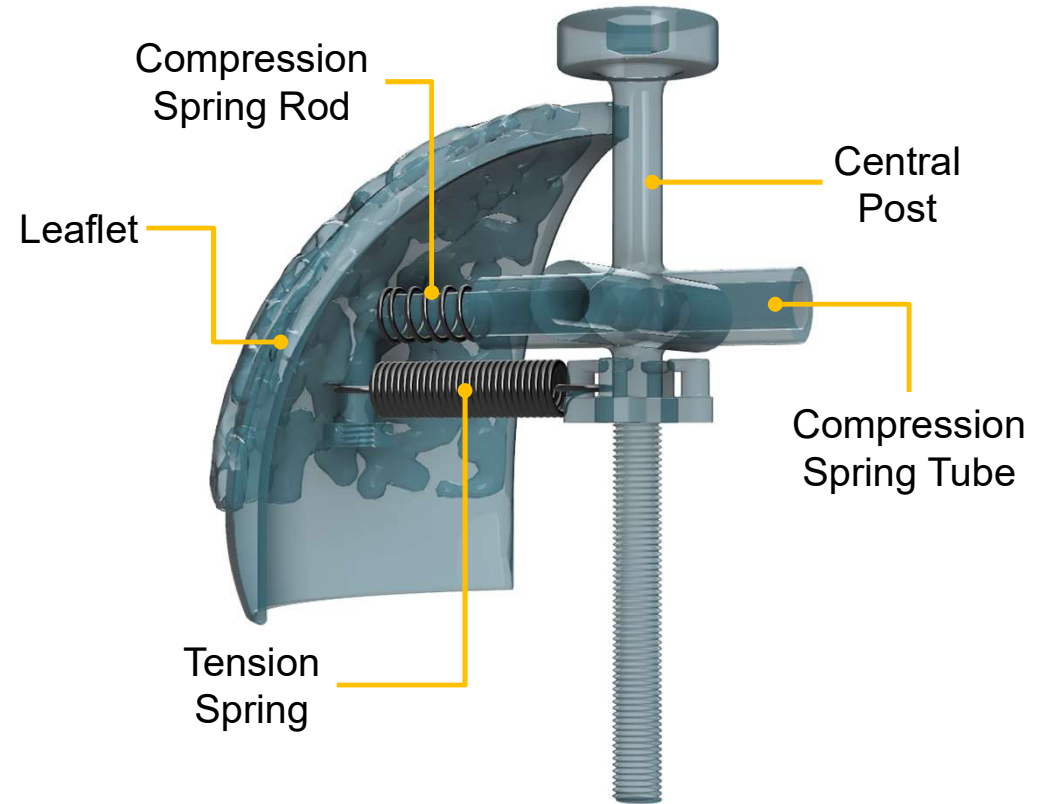
Specific Aim 1: Hypothesis

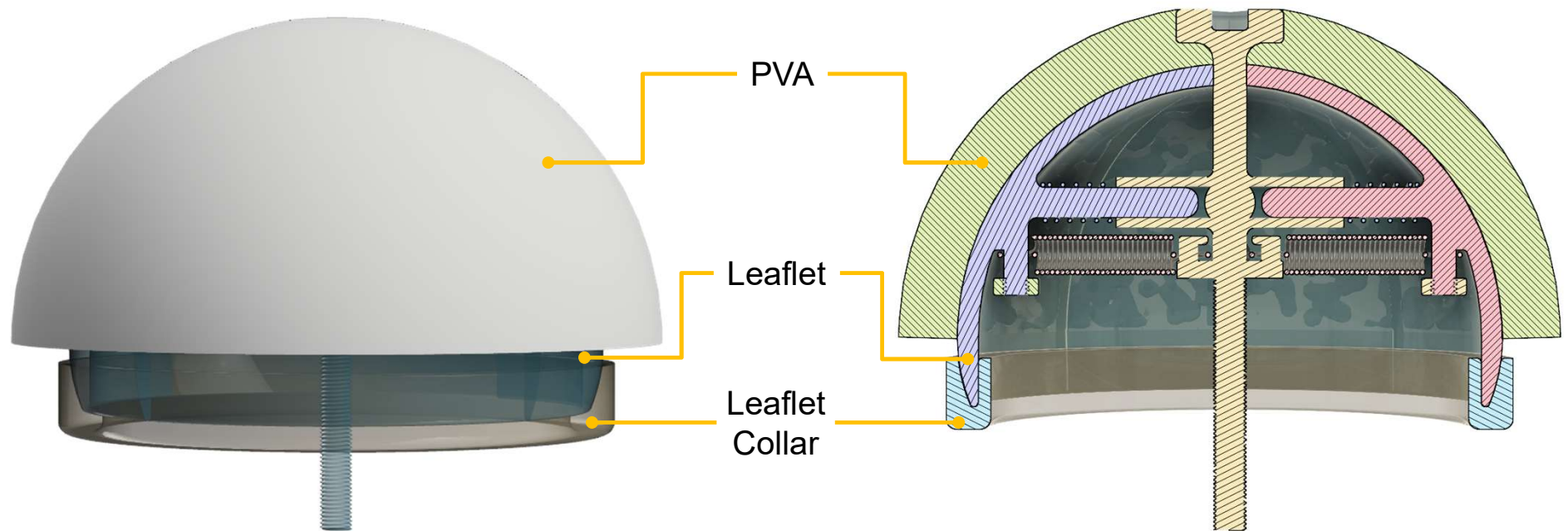
- Application of bending-like strains in viscoelastic materials will create strain patterns similar to the alignment of collagen fibers in articular cartilage.

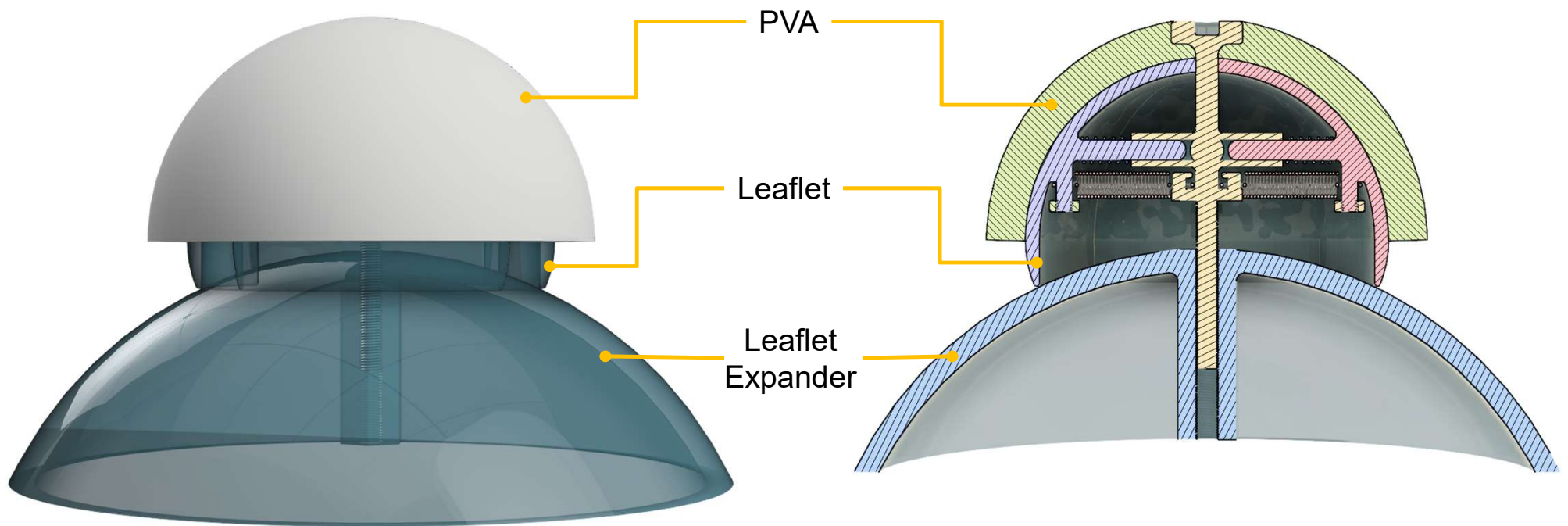












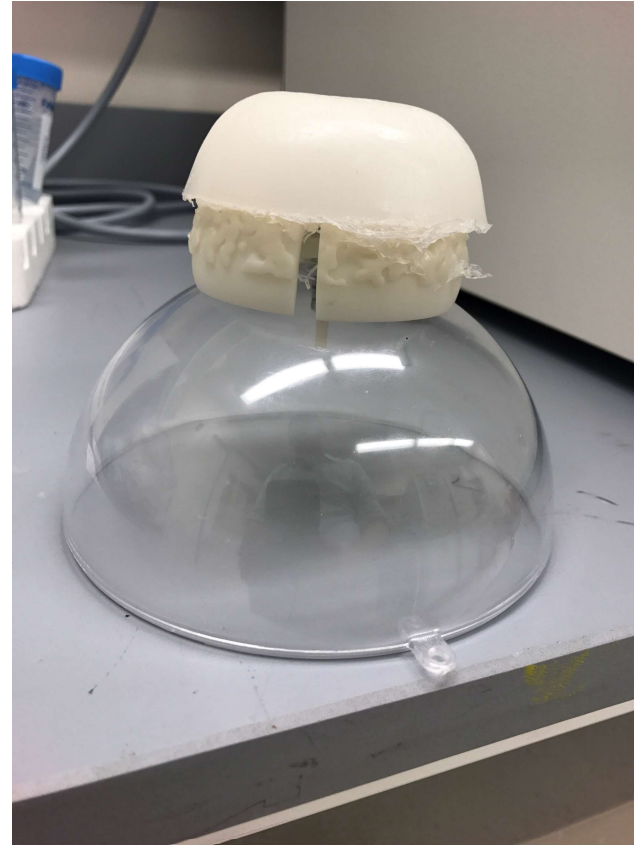
Assembled mold



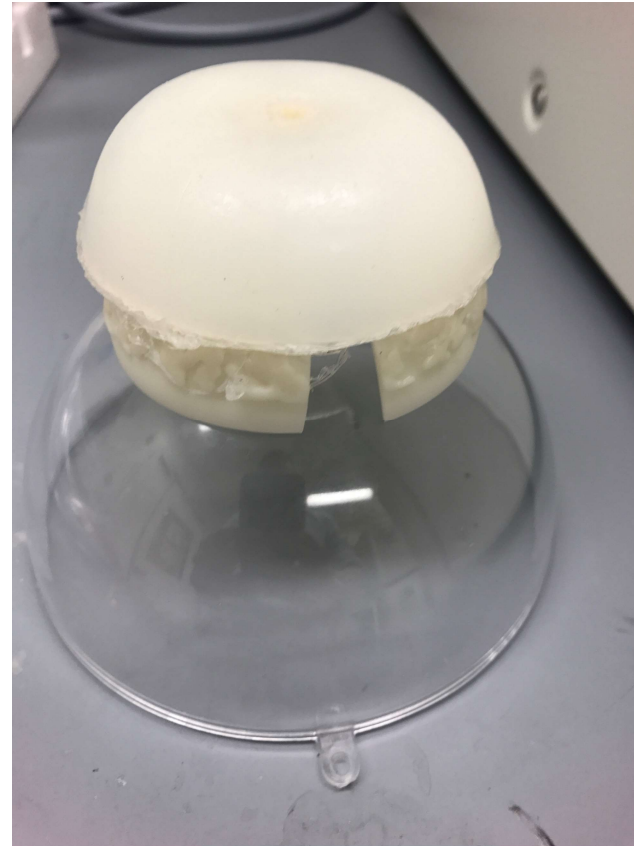
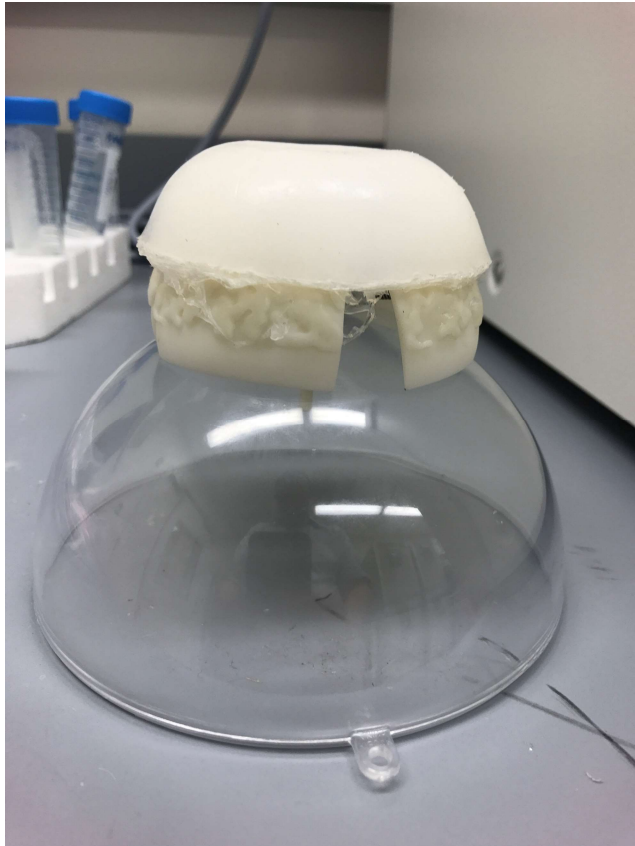
Assembled mold



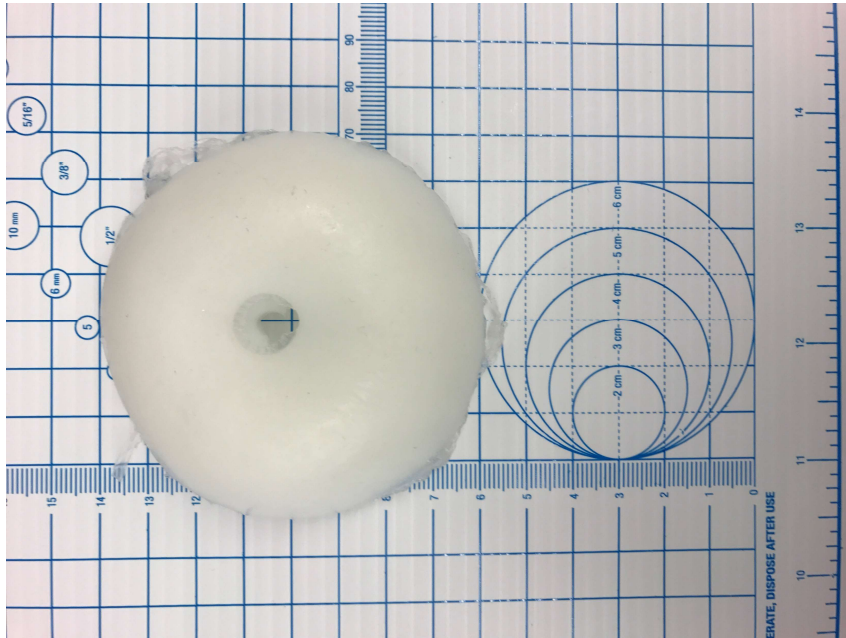
After 1 freeze/thaw cycle



Leaflet expansion



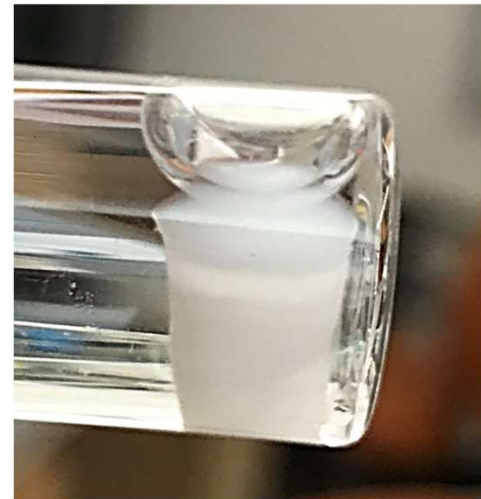
Post-crosslinking



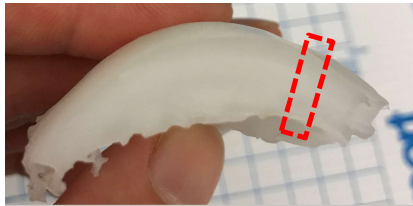
~ 33% Strain



PVA cryogels post-expansion have stratified layers

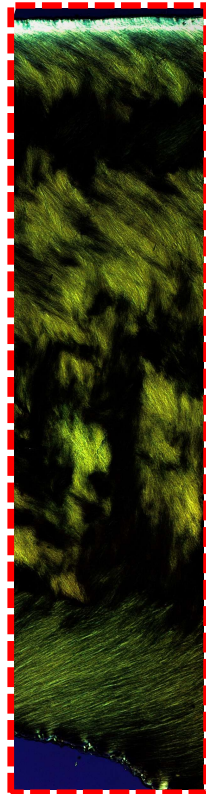


Polarized light images of 10 mm thick PVA Cryogel

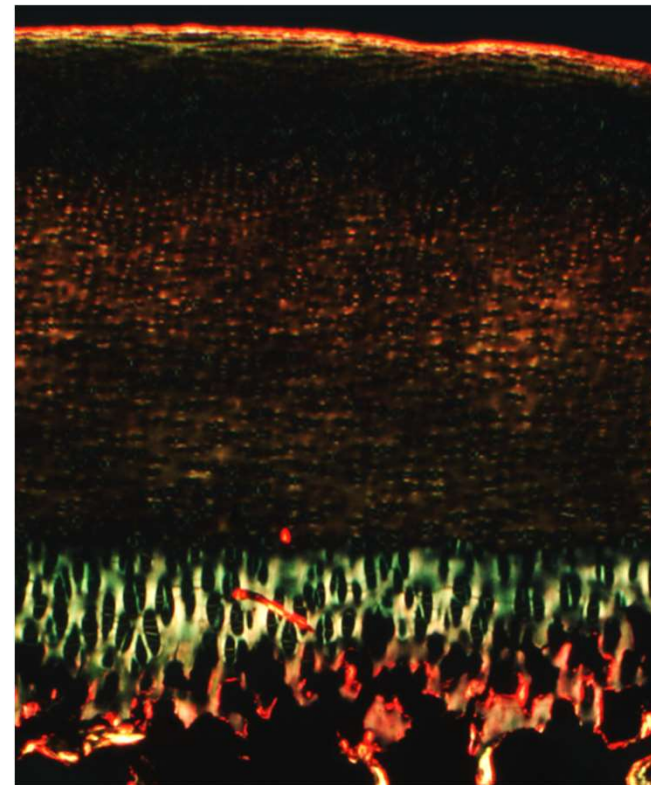


100 µm thick section

Dilated PVA



Newborn (2 to 6 wks) Porcine Cartilage



Superficial
Tangential
Zone
(10-20%)

Middle Zone
(40-60%)

Deep Zone
(30%)

Recreation of collagen architecture

