Mesh analysis and subdomain size study in human lamina cribrosa

ARC 2021

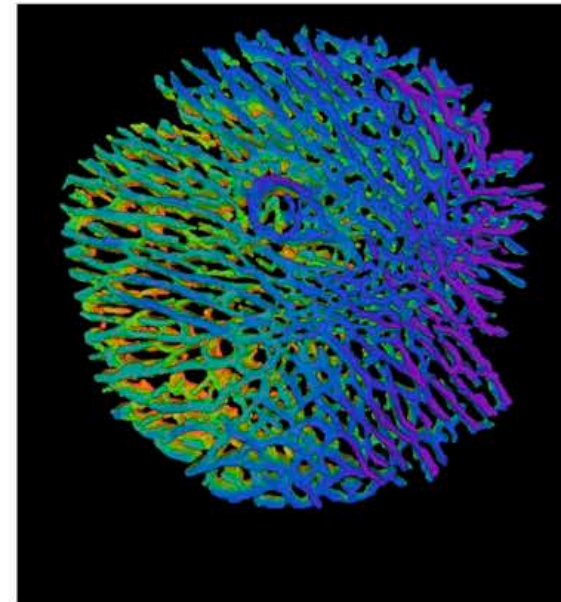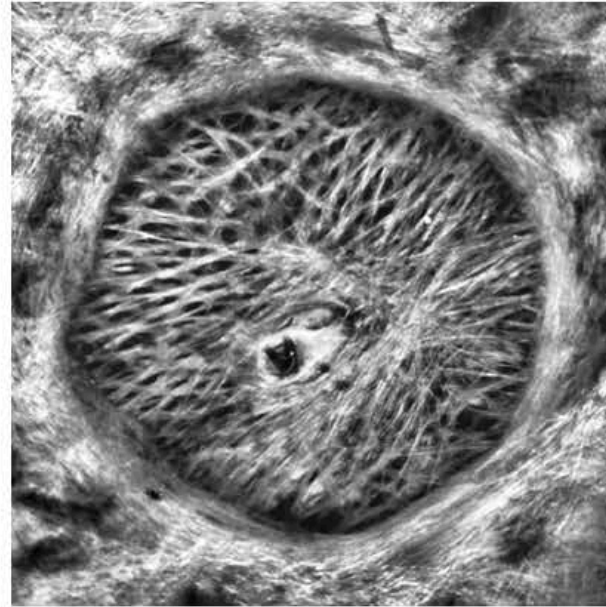Presented by: **Hirut Kollech**

PI: Jonathan Vande Geest, PhD

Department of Bioengineering

Swanson School of Engineering

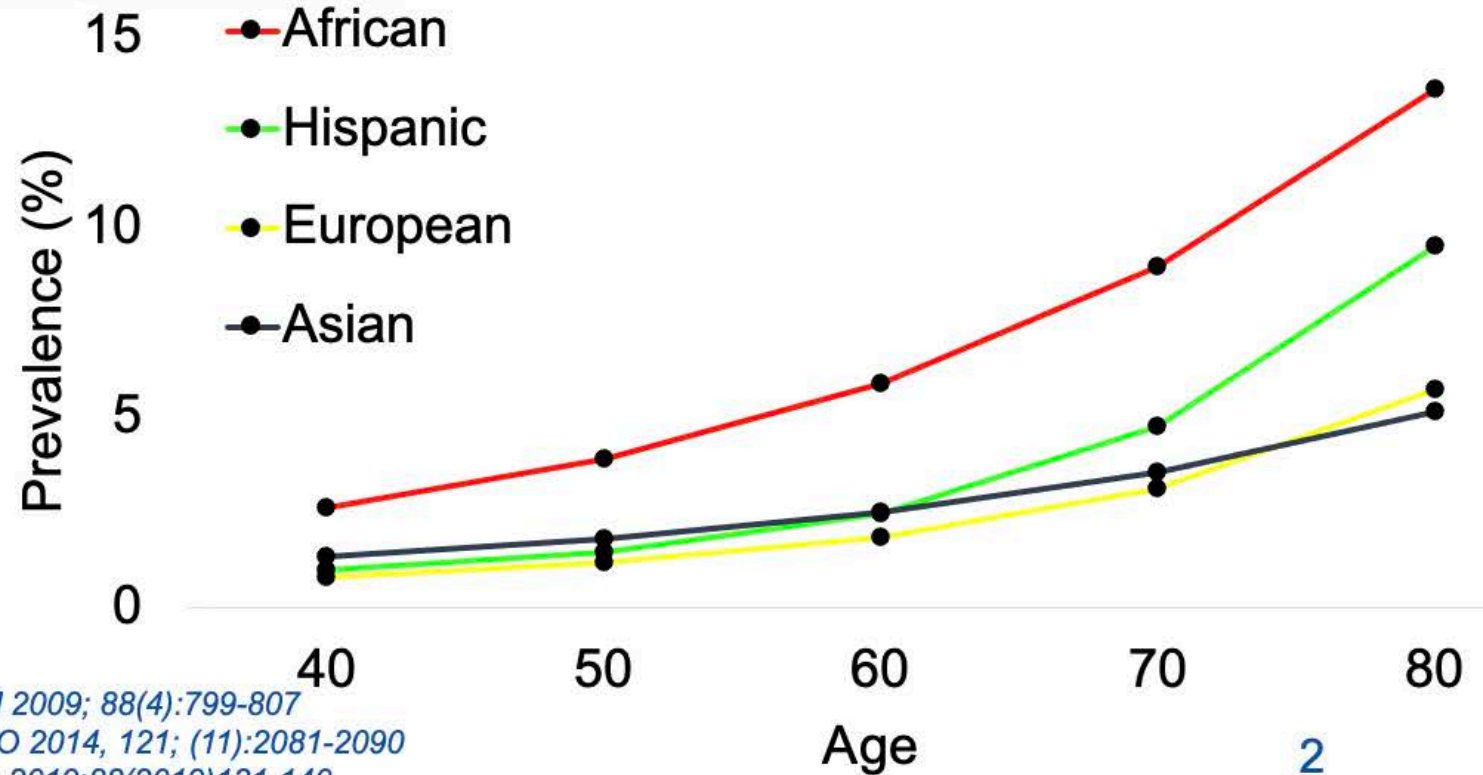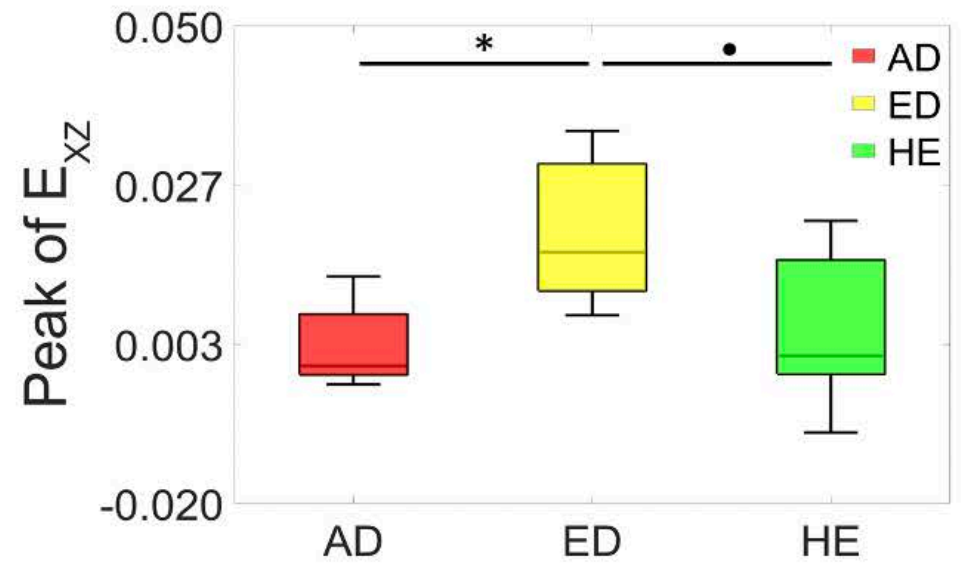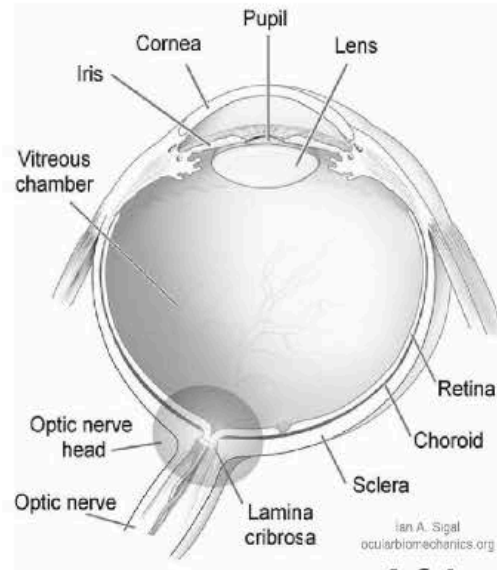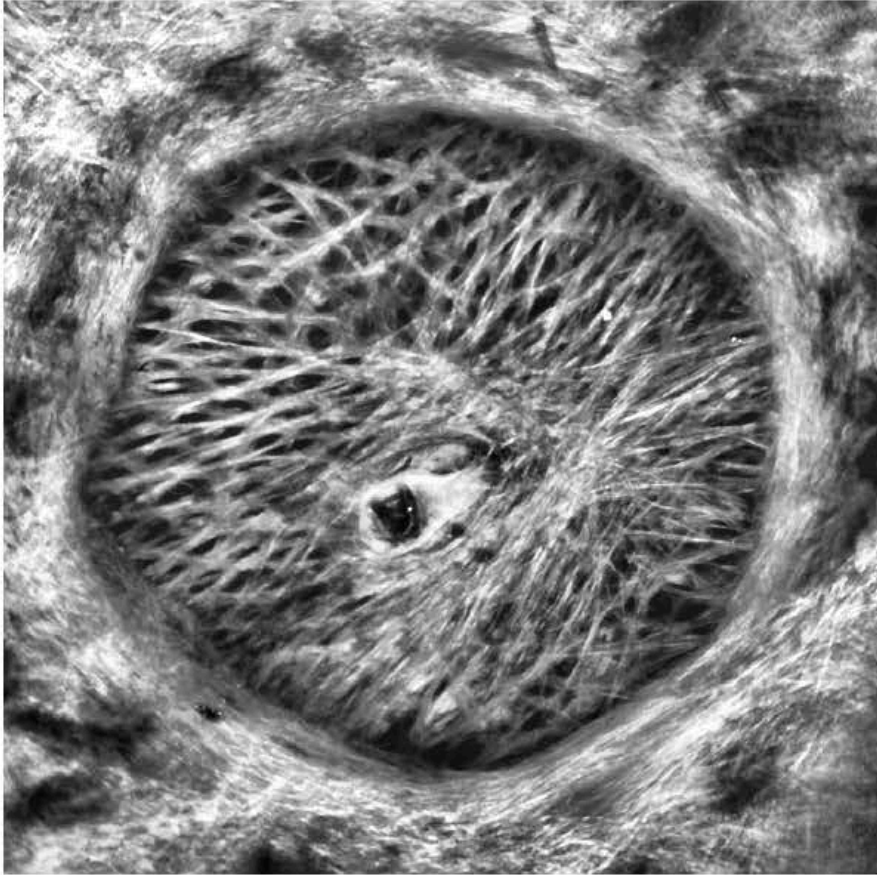McGowan Institute for Regenerative Medicine

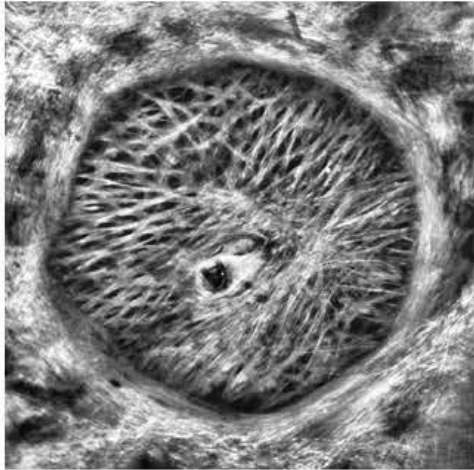Vascular Medicine Institute

Louis J. Fox Center for Vision Restoration

University of **Pittsburgh**

PittCRC Center for Research Computing

NIH

XSEDE Extreme Science and Engineering Discovery Environment

PITTSBURGH SUPERCOMPUTING CENTER

Soft Tissue Biomechanics Laboratory
https://stblvandegeest.com/

Motivation

Ian A. Sigal
ocularbiomechanics.org

E_{xz} box plot — Peak of E_{xz} vs AD, ED, HE

- AD
- ED
- HE

Prevalence (%) vs Age

- African
- Hispanic
- European
- Asian

Sigal IA et al, *BMM 2009; 88(4):799-807*
Tham YC et al, AAO 2014, 121; (11):2081-2090
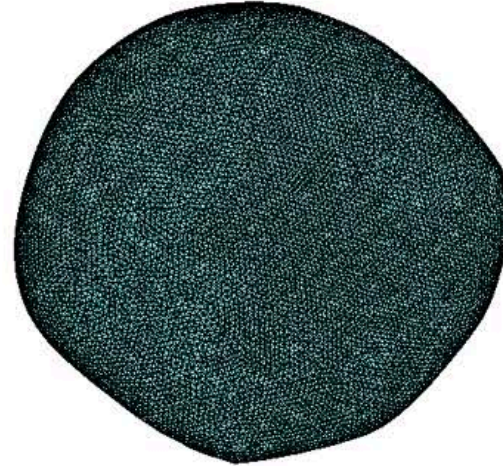*Behkam et al, Acta 2019;88(2019)131-140*

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Overview

2P SHG image

Segmented LC image
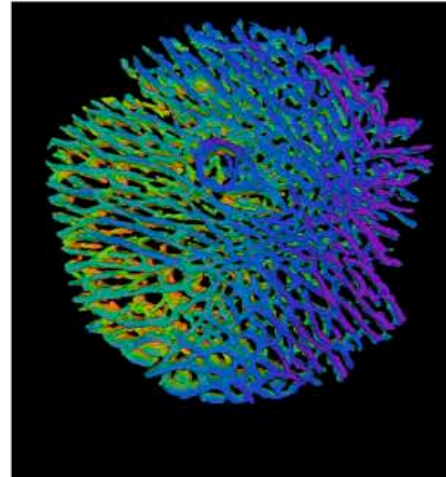
LC mesh

FE simulation (1/8th of LC)
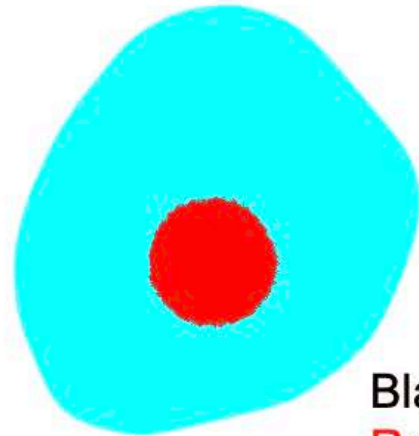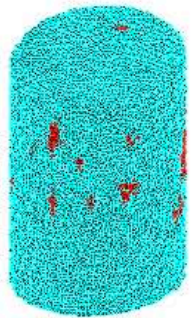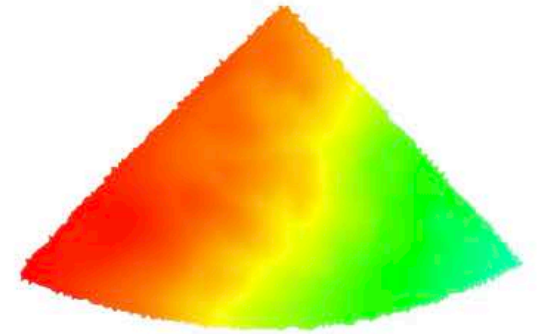
Black - collagen
Red - non collagen

Optimization (iFE)

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Preliminary results from current DOE
- ❑ Subdomain radius (60-300 microns)
- ❑ Mesh convergence (element size 2-20 microns)